

PROJECT CONTROLS UNIVERSITY – IN AN INTERNATIONAL ARENA

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Key words:

SYNOPSIS

This paper discusses the issues surrounding International project work for cost engineers, planners and estimators. The prime focus is a solution that has been developed by a specific company to train its staff. Over the past year, the author has visited four countries and trained over 250 people via this programme, and shares the development process, plus some of the lessons learned that have been discovered along the way. He hopes that you will find the paper of use should you be venturing down this training avenue in your own environment.

Why is the training of Project Controls people in the work processes in which a specific company works considered to be so important?

Our chairman emeritus feels that the Project Control team can make or break a project. This quotation was considered important in 1992: “Project Control is the basis for getting good work, managing it, and for success or failure in the Engineering/Construction business.” *Stephen D. Bechtel, Jr. June 11, 1992.* In 2000 one should recognise that the emphasis clients place on the importance and criticality of Project Controls has dramatically increased in magnitude and severity. The company recognises this and has initiated this programme in response to this business need.

Why is it that the title “Project Controls” is proving to be such a popular name for our profession?

Is it because it is not very challenging, perhaps even bland? Perhaps that's the problem. Why is it project controls people always seem to be up against a hard spot on virtually every project that we visit? Is it because we are such accommodating people that we take all the projects' problems on to our own shoulders, or are we ‘naïve’? Most non-project people always seem to refer to projects when they are completed as either being ‘on schedule’ ‘behind’, or ‘within budget’ or ‘over budget’. The reality is that during the life of the project most of these people don't seem to take the relevant level of interest in either subject unless cajoled, intimidated or forced to take notice - this being the province of the “project controls” people. This is a conundrum that has puzzled me for many years now.

What does International mean?

Does it mean a place away from your Home Office? Does it mean a place where you can not get an Internet connection? The answer of course lies somewhere in these questions, but should we rather consider that this is not really the issue. Our own association has had

its own problems with this concept, so instead of trying to prove the obvious, we will attempt to prove my theory from the point of view of what International is not!

Where is International?

Obviously it is not national. But what about a project in your home country that is run from a project office - would the problems that the project faces not be similar to those that we run in other countries? Take for example the Channel Tunnel Rail Link (CTRL)project in England. This is one of the biggest Civil engineering projects underway in Britain and its project headquarters are in London. Our main home office is also in London but this project is a complete entity in itself, so why should it be run from our main London office? The answer is that it is not. It operates as a complete project, and for the sake of this argument may as well be in another country. So why not for example take the view that by setting out with a refreshing new mind set at the start of the project and consider it as an International project? How would this change your approach? Would you for example consider the Project Execution Plan from a different perspective? My contention is that you would and that the energy required to kick off an International project is so different from that devoted to a domestic project. We will develop this argument further during this discussion, but would request that you keep this thought firmly in the forefront of your mind as we walk through these concepts.

Why is International different?

Well why is it different? Is it because we don't speak the language – yes; is it because it's a long way away – yes; is it because we cannot get into a car and go to the project location – yes; is it because the weather is different – yes; is it because the local laws are different – yes. All of these and many more, but the point is that these few items plus many more are surmountable with determination, automation, systems, and discipline amongst all of the project parties. So what's the problem then?

Why we Developed our Project Controls University [4]?

We want to Start Projects on the Right Foot [3] as stated by Gerard Beguinot to the AACE conference in 1992. The concepts he discusses in this paper have been a key leader in the formulation of the thinking relative to this programme.

The Programme is built in a modular structure and has been developed across the Bechtel organisation taking about 18 months. The slide shows presentations which consist of approximately 900 slides spread across 16 modules, which comprise the base elements of the Project Controls Function. Support documentation such as procedures and specific project examples could double that amount of presentation material, which is why we have adopted the module presentation approach. This set of modules has been specifically modified to represent the work process most appropriate to our Europe Africa Middle East and South West Asia region. The programme is in an evergreen mode, as the material will evolve with updates to Procedures etc. Regular updating of the material would be initiated as a result of feedback from the projects and Functional Management initiatives. A Lessons Learned programme is operational being fed by experience gained from the projects, particularly as a consequence of project people having attended part or all of the

programme. The lessons learned during implementation will be incorporated in the next and subsequent updates to this learning material.

Method of Implementation

Initially selected individuals were tasked with attending a series of “Focus Group” sessions to flesh out the support material to the modules and relate the specifics to Bechtel Group Inc. Project Control Department Procedures and EAMS Business Management Procedures. These Focus Groups introduced the PCU concept into the Project Controls community, by identifying local experts in specific disciplines, who added their specific element of knowledge into each module as appropriate. The modules incorporate all the aspects of the course i.e. Corporate Material, Lecture Notes, and worked examples as appropriate. The experts have provided their input via the Focus Groups, and module packages have been formulated to include this more specific approach. The Final Document represents the consolidated EAMS approach to the PCU - Programme.

What is expected of the students?

The Programme participants will be expected to achieve an improved level of competency through the following:

Attend classroom lectures on specific modules when these are presented, when invited to do so. Prepare them through self-learning via either Bechtel Intranet, CD ROM, Project Controls Home Toolbox Pages. Read the associated procedures and instructions. Revert to their functional Manager for specific discipline related enquiries. Initiate tutorials if necessary with Functional/Project experts, for further one to one explanations of specifics, as related to the individual’s needs. Attend Functional/Project group tutorials/workshops where these are made available. Identify “Lessons Learned” to the Functional Management Group, as these become evident. Overall concept is to start applying the work processes in a consistent and structured manner, and be willing to identify stumbling blocks where found, and work with Functional Management to find working solutions, which can be shared across the wider network of Project Controls Staff.

What is expected of the Project Control Department?

To Provide Access:

Bechtel Group Incorporated Procedures, Generic Operating Procedures, Generic Project Procedures Project Procedures, Business Management Instructions, Field Project Controls Handbook, Technical Guidelines, Project Controls Toolbox, provide Access to Functional Experts for appropriate tutorial, Individual Small Groups and Project Teams.

Figure 1. The body of Knowledge [4]

What is the body of Knowledge?

We have used this block diagram to describe how all of our documentation fits together, and to highlight other access points for our staff to gain links to other institutions and

associations. This portrayal has proven to be most useful in explaining how the jigsaw of the knowledge fits together. We also indicate which elements have been recorded into our Intranet web site, plus which elements are available on CD-ROM for distribution to sites without Intranet access.

PCU Training Concept:

Figure 2. PCU – Programme Theme

Our programme is built on four fundamentals:

Knowledge - each individual brings their own particular knowledge to the programme. **Skills** - each person has their own particular skill set when they start this programme which is unique to them. **Competency** - we are intending through this programme to increase the competency levels of all the people participating. **Achievement** - everybody associated with this programme should leave with a sense of achievement for the programme to be a success, including the participants, the lecturers, their colleagues and peer groups and the project teams with whom they work. We believe that all the participants should reach an achievement level consistent with their expectations. The pyramid is built on a wide base of Organisations and Systems, Planning and Scheduling, Cost Engineering, Finance and Accounts. All this leads to our major tangible deliverable. Reports! Without a deliverable that is produced on time, to the correct quality with the correct analysis, Project Controls will not make a difference on projects. Without reports, we are unable as a company to communicate our results to the appropriate parties.

Project Controls Life Cycle Map

Figure 3 Project Life Cycle Map [4]

This map is designed to show the relative generic time frames by which we expect key work processes to be in place. Each element is referenced to a Corporate procedure that links back to templates and “how to” generic operating and project procedures. An extremely useful concept to use when deciding where to pitch the training effort to hold the participants’ attention. Many text books refer to this process but the best that the author has found was written by Al Lorenzoni and Forest D Clark [1], which sets these concepts out clearly in an easily read format. We recommend this book to our participants to help them grasp the fundamentals.

PCU Pyramid

Figure 4. The Project Controls University Pyramid [4]

When setting out on this journey we needed to direct our thinking processes clearly. Using this device and identifying via a Strengths, Weaknesses, Opportunity and Threats (SWOT) analysis, we clarified our needs in terms of a modular approach to learning. The pyramid symbol has become synonymous with the programme and has become a useful device to explain the course to a wide ranging audience.

This programme takes 45 hours of lecture time to present. When we talk about presentation time, it is implied that this is pure lecture time and does not include such items as refreshment breaks, logistics of moving between facilities and other factors which affect presentations of this nature; nor does it include reading of the relevant procedures. Number of hours per module is to be considered as guidelines and also it should be realised that these are the fundamentals, and are not necessarily Project Specific. Each project will have its distinct requirements and these must be considered when creating the Project Specific Procedures. The number of sessions involved are formulated in order to achieve manageable blocks of time. In principle, elements associated with the PCU - Programme will be held over 16 sessions and broken down into 10 Blocks. Each session has an introduction and conclusion element. The Sessions are presented in a structured way and are "Stand Alone" i.e. on their own merits, and are independent of other sessions. Each session should however contribute to an increasing number of Earned Blocks. Once a candidate has achieved credit for all the blocks which would represent the completed course, the candidate is awarded a completion certificate to authenticate satisfactory attendance. The restraints imposed are fundamentally in place, but due to the nature of the Project Business, it is sometimes inevitable that not all people can be made available on a regular or frequent basis to suit a highly structured course. Therefore the Sessions and Block concept has been introduced.

The intention is to demonstrate that we are painfully aware of the time restraints which are significant on projects, and as we can always expect this question, our response above has been formulated to indicate clearly that we want to work with the projects to overcome this hurdle, rather than let it be stumbling block to progress.

Influence on Cost - Curve

Figure 5. Influence on Cost Curve[4]

This classic curve in many respects encapsulates the whole programme and has proven to be a key learning point for many of our participants. We would refer you to the AACEI Skills and Knowledge handbook [3], as these concepts are the core of any teaching programme involved with the control of time and money on projects. Cost influence at its peak early in the project life cycle diminishes across the project schedule. [3] The opportunity to influence costs as discussed by A. Larry Aaron in 1996 at his lecture on Constructability has been the basis for the thinking behind this concept. Principally, this says Cost expenditure is significantly rapid in the front end of the cycle and the most significant influence one can have on controlling costs occurs at this time.

The Thread

In our world of Project Controls many subjects are threaded through each other so as to ensure that you give the cross-references adequate attention.

We employ a Road Map concept which is designed to make it practical for you to find the appropriate reference document quickly. It does not pretend however to ensure that every cross-reference is completely covered. Do ensure that you inspect the appropriate

instruction for your own circumstances, and check that you have the correct cross references in place this instruction is given to all of our participants.

Figure 6 Intranet Toolbox page

This is a sample from our Intranet web pages and is a navigation tool designed to gain access to the Toolbox via this screen.

Identifying Device

This is our device for promoting the programme. We decided once we were going down the Interactive Learning route that we would design a helper. We have called him Hector the Hard Hat. He clearly carries our message of safety equipment, and the hard hat indicates that the core nature of our business is construction driven. Our audiences have reacted well to him, and we plan to continue using this type of imaging concept to help the learning process.

Figure 7 – Hector the Hard Hat Intranet Device[4]

CONCLUSION

The programme is tailored to represent the real world in which we work. It is designed to build one set of knowledge onto another, and each module stands on its own. The cross thread of knowledge should however be apparent when the course is being developed, and participants should be able to see clearly how one step leads naturally on to the next.

We have been extremely encouraged by the general acceptance of our programme, and the lead it has given to our efforts to share knowledge about the Project Controls function across an organisation working in so many countries, with so many fascinating local cultures. **A real education for the educators?**

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Des Pellicena asserts the moral right to be identified as the author of this work.

BIOGRAPHICAL NOTE

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Professional experience: 30 years in engineering and construction

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Publications, papers and patents:

Most recent significant accomplishment:

Delivered in conjunction with Dr. Ken Humphreys a seminar in China in 1997 - which has had a huge and important effect on the profession and is considered to be of a long lasting nature. Out of the seminar in China, the Chinese developed a certification program paralleling that of AACEI; they have founded a National Cost Engineering Society, and the group who attended the seminar were the initial candidates for certification; now certification is required on most cost engineering work in China. Over 50,000 people sat for the most recent Chinese examinations. The personal contribution made will have massive implications for our profession.

Authorized papers & lectures:

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