

# THE ENGINEERING AND CONSTRUCTION CONTRACT AND ITS IMPLICATIONS FOR PROJECT PROGRAMMING PROCEDURES

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The New Engineering Contract was introduced in 1993 with a view to achieving three aims of flexibility, clarity and simplicity, and to provide a stimulus to good management. Now in its third edition and with a new title of the Engineering and Construction Contract, it places great emphasis on project programming and requires early warnings of anticipated delay and its effect on cost. As a result many contractors are establishing procedures to ensure compliance with these contractual requirements. A questionnaire survey was carried out, supplemented by semi structured interviews, within a major civil engineering contractor in order to investigate the standard programming procedures (known as the “Established Approach”) in terms of their functionality and applicability to the contract clauses, and their impact on project management. The results show that the Established Approach not only complies with the programming requirement of the contract, but also is a very good project management tool. But to make it work, staff need proper training and should be allowed sufficient time to operate the system. Commitment from both employers and project managers is also needed.

Keywords: ECC, programme delay, early warning, project management

## INTRODUCTION

The Engineering and Construction Contract (ECC) is part of the New Engineering Contract (NEC) family and was developed following the identification of a need for new contract strategies. The adversarial nature of the construction industry prior to the issue of the NEC, and the need from employers to have greater certainty over time, cost and quality led to the development of the contract. The NEC places emphasis on flexibility, clarity and good management by emphasising communications, co-operations and Programming (Eggleston 2006) as well as the need for clear definition at the outset of the types of information which will be required. The early warning and compensation event clauses within the NEC (ECC) are unique to this form of contract and goes some way to achieve the requirement of the contract being a stimulus to good management. Gerrard (2004) believes that these two areas rely upon mutual trust and co-operation between the parties. As both of these clauses have an effect on the programme, the issue for contractors therefore is how to manage the requirements of the contract regarding programme acceptance and the management of compensation events. A major Civil Engineering Contractor, BAMNuttall has developed their own method of addressing these issues which is known as the

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Established Approach. This paper researches the effectiveness of the Established Approach in terms of how it meets the requirements of the ECC and provides a competent method of programme acceptance and management.

The paper is structured as follows: background, research method, results, discussion and conclusion

## **BACKGROUND**

The ECC is considered to be pro-active in its approach to managing the project by imposing a management discipline on all participants (Redmond, 2006; Bridgewater and Helmsley, 2006). Bridgewater and Helmsley (2006, p.40) consider the ECC to be a 'project management tool which is used to flush out all the information required for the project, as well as to set up good practices for [its] management'. One of the aims of ECC was that there should be no late claims at the end of the project (Nason, 2002, p.2) and that the final cost and date for completion should be more accurate during the construction period than is given by other, conventional contracts (Broome, 1999). The early warning requirement within the contract and the compensation event clauses should ensure "early resolution of payment and programme ramifications before the work is done" (Courtney-Hatcher and Woolley, 2003, p.5). Broome (1999) and Kirby (2001) feel that full compliance with these clauses requires large amounts of on-site administration during the construction phase making demands on the time of project staff and generating much paperwork. Redmond (2006) suggests that the parties to the contract should appreciate that there is a large management commitment required in order to make the project a success. It is therefore apparent that a method should be devised to control the amount of information which arises and The Chartered Institute of Building (CIOB) (1991, p.2) have stated 'the ability to control must emanate from a plan – a way of proceeding – for without a plan only chaos would ensue'. Once a plan has been formulated, it is essential that this is noted and communicated to all those involved with the project, and this is normally delivered via a programme. Cooke and Williams (2004) also concur that control is not possible without a plan, and without a programme there is no effective means of exercising control. Programmes allow progress to be reviewed at regular intervals by all parties involved in the project. During construction projects delays often occur and necessary action needs to be taken when it is felt that the completion date will not be achieved. This is either done by issuing an instruction to the contractor to expedite or accelerate the works; or to grant an extension of time, subsequently, extending the contract period. These delays caused by circumstances such as bad weather, waiting for instructions and unforeseen ground conditions, will have a consequential effect on the programme and must be incorporated to show this.

The ECC places considerable emphasis on the programme, more so than other forms of contract, Adams (2003, p.5) suggests 'that time has largely been ignored in construction contracts...perhaps the most revolutionary mechanism in the NEC is contained within clause 31 – the programme'. The programme is a prominent document for administering the contract and its role is to both monitor progress and manage change and therefore it is important to make sure it is kept up to date (Cooke and Williams, 2004). Adams (2003, p.5) comments that 'one of the strengths of the NEC approach is that the initial programme sets the benchmark that all parties can readily understand' It allows for the effects of changes and delays to be quantified and costed by correlating compensation events to the production of revised programmes when those events transpire (Adams, 2003). However, Gerrard (2004)

and Hide (2007) believe that many programmes lack sufficient detail to be fully compliant with clause 31.

The ECC requires an initial Accepted Programme, indeed the Employer can retain one quarter of the value of works to date, under clause 50.3, until the first programme is received. The contract avoids expressly stating that the contractor should comply with the programme but the requirement for revisions at regular intervals ensures that it does not become a redundant document (Eggleston, 2006).

A binding obligation between the Contractor and the Project Manager exists under clause 16.1 to give an early warning notice as soon as either becomes aware of any matter which could increase the total of the prices, delay completion, delay meeting a key date or impair the performance of the works in use. Additionally, this clause grants that the Contractor may give an early warning to the Project Manager of any other matter which could increase their total cost (Eggleston, 2006). Eggleston (2006, p.116) describes the Early Warning System as ‘one aspect of [the contract] which attracted much attention and commendation’, essentially motivating the parties to identify problems and adopt a proactive approach to finding a solution. A survey by the NEC best-practice panel has revealed that failure of projects under the contract, are principally caused by the early warning system not being endorsed (Cathcart, 2003).

The term “compensation events” applies to variations and claims under the contract and has been the most discussed and disputed aspect of the contract (Eggleston 2006). A compensation event will occur if there is an event which will entitle the Contractor to be compensated for any effect the event has on the prices and completion date or a key date (Jones, 2006). Assessments of the effects of the events in terms of direct costs and delay and prolongation costs should be submitted by the contractor which will eliminate entitlement to separate delay and disruption claims which under traditional construction contracts would be submitted several months after construction is completed (Broome, 1999). However, Jones (2006) believes that the process is laborious as it relies on programmes for the assessment of defined cost and it requires a revised programme to be drawn up if any delay or disruption is involved and that the procedure is rarely adhered to by either Project Managers or Contractors. Eggleston (2006) suggests that this is because revised programmes can be time consuming both in their preparation by the Contractor and consideration by the Project Manager even when compensation events are infrequent. Tyrell, (2003, p.7) indicates that ‘the strictly enforced requirement of the contract can be extremely onerous, on both the Contractor and Project Manager. However, local agreement on the necessity or otherwise of producing programmes to include compensation events that have no time significance can partly alleviate the problem’. Nevertheless it is important that there is an up-to-date accepted programme in place, which incorporates a date for planned completion in order to assess the time effects of compensation events.

If the compensation events affect the programme then clause 62.2 states, ‘the Contractor submits details of his assessment with each quotation. If the programme for remaining work is altered by the compensation event, the Contractor includes the alterations to the Accepted Programme in his quotation’ (ICE, 2005, p.17). Clause 32.1, states that ‘the effects of implemented compensation events must be shown on the revised programme’ (ICE, 2005, p.10). If there is no Accepted Programme in place then the Project Manager is required to perform their own evaluation of the programme for the outstanding work which is a major incentive on the Contractor to

keep their programme up to date. The compensation event procedure does have the advantage of creating a rolling final account, an up-to-date estimate of when completion will be achieved and, because the Completion Date is constantly visible; all parties know where they stand and what they are aiming at (Broome, 1999). Another benefit is that the programme can be used to assess delay, disruption and prolongation in the event of a claim. Therefore it is essential that all team members understand both the requirements and effects of programme management.

It is therefore apparent that the presence of an Accepted Programme and its subsequent revisions is the key to a contracts success in terms of the requirement for early warnings and notifications required under the Compensation Event clauses. It is also clear that this places added pressures on both the Contractor and Employer in maintaining control over the flow of information and the need for programme revisions. One Civil Engineering Contractor, BAMNuttall, recognising the importance of these clauses, has developed their own approach to overcoming these issues. Known as the "Established Approach", it is a 6 point procedure which must be followed when producing the required programmes. The first stage is to establish the implemented change and then following this through to a potential, revised, completion date at the second. All of this assumes that all events that are known about will happen. The third stage is to delink the potential alternative outcomes in the form of a risk assessment, to leave only genuine likely events. From this, progress to date can be plotted and any delays dealt with in terms of updating the programme. The final stage allows for any further action deemed necessary - including changing the programme. When the programmes are submitted to the client, they are accompanied by a cover document in order to assist in achieving acceptance. The cover document is the formal submission of the programme for acceptance and provides a convenient means of conveying notes and other information that cannot otherwise easily be accommodated on the bar chart. It can include any accompanying or separately issued documents and provides a means of summarising the current position and adding accompanying narrative. Proper use of the Cover Document will help acceptance of programme submissions and avoid the withholding of payment against the first programme only.

## **RESEARCH METHOD**

A questionnaire survey was conducted which investigated the programming procedures implemented by the company. Opinions were sought as to the functionality and applicability of the Established Approach and the soundness of company programming procedures with regards to the successful management of a contract compliant programme under the ECC was researched. The survey was undertaken with a small sample of people within the organisation who have experience of using the programming procedures as well as interviews with the Chief Planning Engineer in order to clarify points made. The questionnaire consisted of a standard set of both open and closed questions which were sent to all respondents. The closed questions prescribed a range of responses from which the respondent could choose to express their degree of agreement or disagreement and these were deliberately more focused than open-ended questions. Open-ended questions were selected where the questions were of an exploratory nature and possible answers were unknown.

Questions were grouped in order to facilitate easy comparison of results and were presented in the form of statements with a Likert scale depicting levels of agreement

where 1 was Strongly Disagree and 5 was strongly agree. Group A statements related to the Established Approach. The intention of the statements was to establish the practicalities of the procedure as the chosen respondents had experience and knowledge of it. It was felt that the responses would provide an overall view as to whether the procedure was practically demanding or not. Group B statements concerned programme acceptance. It was established from preliminary interviews conducted at the outset as well as general observations and literature that programme acceptance still remains a very difficult process with a large percentage of projects in the industry which do not have an accepted programme in place. Group C statements related to change and included both statements associated to early warnings and compensation events. These are unique to the ECC and are an important inclusion within the revised programme. With this in mind, they are incorporated within the Established Approach procedures. Group D consisted of open questions which provided the respondents with the opportunity to give their own responses and personal insight in order to enable a wider scope of potential answers which may not have been previously considered.

## **RESULTS**

A total of 12 questionnaires were distributed and 10 were returned giving an 83% response rate which is understandable as the survey was undertaken within the company which uses the Established Approach and it is in employees' interests to see the applicability of the system. The respondents had a variety of experience within the industry, ranging from 1 year to 10, with an average of 5.6 years. Experience of the Established Approach ranged from 1 to 3 years, the average being 2.15 years. The results showed that the procedures were not difficult to understand despite the differing amounts of experience respondents had.

All respondents were in agreement that the Established Approach fully complies with the requirements prescribed in the contract clauses and that the process was easy to understand. The Chief Planning Engineer stated 'the contract requirements are quite prescriptive; even though there are a lot of them they are written down so they are very clear. It is easy to say when a programme doesn't fully meet one of the requirements. What we try to do with our Established Approach and the Cover Document is to provide a means of bringing everything together. Most people now understand that the programme for acceptance is a collection of documents, it can't be a single document and what we have done is provide a vehicle which actually brings those together'. The majority of the respondents agreed with the Chief Planning Engineer and did not believe that the Cover Document was an area of difficulty.

90% of the respondents stated that the Established Approach is being followed, although one respondent suggested that full implementation of the Cover Document was limited. He suggested that this may be due to ignorance of its existence, the time needed to complete it thoroughly, apathy from the Project Manager or ignorance of the importance of having a coherent programme submitted and accepted. Apathy from Project managers is an important factor as it was stressed at the original inception of the contract that there is a requirement from both the contractor and the employer to perform duties under the contract and to ensure that information is readily available at the appropriate time.

When asked whether all parties understood the original programme and its subsequent revisions, there was a distinct difference in respondents' opinions between the employer's and the contractor's understanding of programmes. Many respondents felt

that Employers representatives did not understand the programme or that they would not commit the time required to understand the programme. The Chief Planning Engineer agreed that it will depend on the site team and that there are examples where the team understands the programme and others where they don't. Literature indicates that a large volume of projects do not have an accepted programme in place but it is apparent from the results that all respondents agreed that programme acceptance was facilitated by the Established Approach. The Chief Planning Engineer felt that the Established Approach is a step to facilitating acceptance due to its transparency, which reduces opportunities for refusal. Again it may come down to the individual Project Manager's viewpoint 'it is a matter of how much consultation and discussion you have with the Project Manager and therefore is a matter of trust'. Another respondent suggested that it may also be a matter of understanding, attitude and experience.

Half of the respondents agreed that the revision process is/was regarded as a team effort. However one respondent strongly disagreed, stating 'it was a joint effort between themselves and the planner for collating the programmes with little or no input from the rest of the team and we are therefore missing the point that the plan in EEC is more than just the programme; it is the resources, the method, the risk etc. Only a team can put this together'. However, most respondents agreed that their programmes fulfil the requirements of the contract which suggests that where the Established Approach has been followed it has provided a systematic method which ensures that clauses 31 and 32 are met.

As stated above mutual trust and understanding between the parties is a vital factor in the success of an ECC contract, and the majority of respondents agreed that the Established Approach promotes this. However, as with other forms of contract, much depends on individuals and where mutual trust and understanding was not evidenced it was felt by respondents to have been due to politically motivated personnel and lack of trust from the Project Manager "who is scared to accept a programme because of all the things they are accepting by default". Another respondent added 'as with any situation in a contract, when things are going well, a programme can lead to mutual trust. Ideally, mutual trust would be there anyway and it is the way the programme is managed that either maintains that trust or undermines it. Despite programmes that clearly show our original intent which are then revised to show progress and change there is invariably a negative response from the Project Manager: sometimes because there is no trust, but usually because the programme is so complex that there is a lack of understanding of the detail and as such it is easier to reject rather than align with the Contractor and use it as a management tool'. Another respondent expressed a belief that Employers view programmes as a Contractor's weapon against them.

The majority of respondents stated that all compensation events are shown on the programme and those which aren't are generally those where compensation events were issued but had no time implication or any effect on the programme logic and so were excluded from the programme by mutual consent in an effort to simplify the process. Another respondent commented 'the ECC form of contract does not anticipate large amounts of change once the contract date has passed and it is difficult to know which events should be included. We have included those compensation events which we believe will impact on the Completion Date as soon as we are aware of them'. In most cases all notified early warnings are shown on the programme although one respondent indicated that it is difficult to find the time to carry this out properly due to the large amounts of information generated from the correct and

timely notifications of early warnings leading to a large amount of potential change occurring. However, many respondents believed that the Established Approach was capable of dealing with a large amount of change, although where there is a substantial amount of change towards the end of the project - when the contractor is focussing on completion - keeping to the Established Approach is difficult. The Chief Planning Engineer stated 'The reality is that the contract didn't anticipate large amounts of change and it is a challenge to maintain the Established Approach when that happens. You have to make compromises, put Compensation Events together and take a more common sense approach'.

The results revealed that only one of the respondents had a 100% score of programmes submitted against programmes accepted, and in all the other cases the number of programmes accepted was significantly lower than the number submitted. This concurs with the views of commentators that programme acceptance remains a challenging concept within the industry. Should then revisions still be submitted in line with the contract despite the previous revision not being accepted as directed by the Established Approach This appears to be an area of difficulty as one respondent stated that compensation event analysis was carried out on the programme relevant at that time, whether or not it was accepted and due to the maintenance of a good relationship between the parties the Established Approach could be adhered to. However the same respondent referred to a different project and commented 'our attempts to ensure acceptance caused problems with the programme: creating an unrealistic, unworkable programme'. Other implications were that it made the impact of compensation events difficult to agree as the programme was not agreed leading to an increase in Project Manager distrust as to what the programme was telling them resulting in protracted final account discussions and poor relationships between the Contractor and Project Manager. The most popular reason given for non-acceptance of programme was a lack of understanding by the project manager, often due to lack of experience.

It was ascertained from the results that the Established Approach relies on availability of suitably trained staff who are fully acquainted with the programming software. If this is the case then the belief is that the Established Approach provides a clear framework within which programme updates can be made but it must be kept up to date and rigorously implemented, even if the Project Manager is slow at responding. It is believed by respondents that it works well as long as the Project Manager is prepared to correctly implement the contract and both parties understand and 'buy in' to the process. A general consensus was that if managed correctly and the whole team are involved in the production of the programme and cover document, it is not only a good way of complying with the contract requirements but also a very good project management tool. Despite this, one respondent added 'on the not so good side, there is a lack of knowledge of Established Approach availability, lack of training for all staff in its use and importance and it needs support to get the first document prepared'.

The respondents highlighted some recommendations for improvement to the Established Approach including a summary section in the Cover Document which outlined briefly what the effects of the revision had on key dates/completion and what the drivers were behind the changes/delays so that the Project Manager would know the status of the project without having to read the rest of the document. Another recommendation concerned the way in which the process is sold to the Employer/PM teams at the start of the contract, the presence of a workshop for all parties is an invaluable resource as it demonstrates a proactive approach to programme

management. The consensus was that the Established Approach itself does not require much change if applied properly. However, there are a few recommendations which should be welcomed by those who pioneered the procedures to maintain continual improvement.

## **CONCLUSION**

Respondents agreed that the Established Approach complies with the requirements prescribed in clauses 31 and 32 and the Cover Document provides a means of presenting the information stipulated in the clauses. Therefore, it can be concluded that the Established Approach is applicable and complies with the requirements. This disagrees from a common view whereby clause 31 programme compliance is very rare and that many programme submissions consist of insufficient detail. Additionally the Established Approach was not considered a difficult process to follow and is capable of dealing with a large amount of change provided that there is teamwork on all sides and an amount of compromise can be reached. The ECC contract is not designed to deal with huge amounts of change, so projects which demonstrated a great deal of change had the potential for the procedures to fail which indicates a contractual flaw rather than a procedural flaw. Respondents regarded the Established Approach as a very good project management tool which complies with the contract requirements. However, the challenges are that it relies on competent resources who are suitably trained with dedicated time to operate it as well as management buy-in from all parties which is sometimes beyond the control of the Contractor.

All compensation events are usually shown on the programme, where they are not it is because the respondents considered it to be too onerous. This resulted in those events which had neither a time implication nor any effect on the programme to be omitted from the programme. However the majority of respondents declared that all notified early warnings were shown on the programme.

The majority of respondents stated that their programmes were up to date, further suggesting that the procedures were being followed. The literature implied that the programme plays a crucial role within the NEC in comparison to other forms of contract. It is regarded as extremely important for administering the contract as it is anticipated, and requires all parties to utilise it. The NEC contains the most prescribed provisions for both programme submission (clause 31) and subsequent revisions (clause 32). It is impracticable to present all the required information on the programme, consequently the Contractor has to portray this in other formats which is where the Cover Document is utilised. Respondents believed that their programmes fulfilled the requirements of clauses 31 and 32 of the ECC and that procedures must have been adhered to in order for this to be achieved. The Established Approach provides a systematic method which ensures that clauses 31 and 32 are met, subsequently it can be deduced that the procedures are sound in relation to the successful management of a contract compliant programme.

The Established Approach, (including the Cover Document) can be regarded as both functional and applicable as it complies with the contract requirements and can deal with a large amount of change. It was not considered a difficult process to understand and the majority of compensation events and notified early warnings were included on the programme. This demonstrates that the procedures are functional. However, it must be noted that where procedures had failed this could be viewed as more of a contractual flaw due to the contract not being designed to accommodate a large amount of change. Challenges remain, such as lack of management buy in from all

parties but on the whole as it works in practice can be considered both functional and sound.

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