Construction finance and cost escalation

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Dr N. M. L. Barnes, Martin Barnes and Partners

I should like to offer some comments on the section of the Paper dealing with contract price adjustment formulae. The Authors conclude that no non-adjustable element should be used.

67. When the Baxter and Osborne formulae were introduced it was suggested that the non-adjustable element (then 15%) was intended to leave contractors carrying a reduced but significant part of the inflation risk. This would ensure that they would continue to resist inflation itself. In practice the payment from a formulae, as it is calculated on the contractor's prices, is unaffected by the actual level of his costs. Consequently, profit is affected just as much by any cost-reducing efforts of the contractor whether there is a non-adjustable element or not.

68. An alternative justification for the non-adjustable element is more logical. This is the argument that the contractor's profit should be held at the level of money value at the base date. As profit is analogous to the contractor's income, one might expect to see it pegged during periods of wage and price restraint by applying a small non-adjustable element. In the absence of a non-adjustable element the contractor's profit becomes index-linked. If index-linking of income becomes acceptable the non-adjustable element might be abolished.

69. In § 40 it is suggested that some employers are making payments on account against claims in order to minimize the price adjustment. This effect may be partly due to the modification of clause 60 of the ICE Conditions of Contract made in the 5th edition, which requires the engineer to certify claimed amounts more promptly. It is unfortunate that the formula reduces the contractor's incentive to present and settle claims promptly. However, perceptive contractors will appreciate that any policy for delaying income is likely to be unsuccessful because it depends upon the accuracy of forecasting the differences between index movements and either bank interest charges or the opportunity cost of working capital. It is not likely that these differences can be forecast with anything better than random success.

70. The Paper makes the point (§ 45) that the Baxter formula is an approximation. Many of its users are unaware of how approximate it is, as no simple practical check of its accuracy can be made. This is because it would take so long to produce a big enough sample of recorded performance that the commercial and inflationary climate would have changed before the results could be applied.

71. In the absence of real data, simulation methods can suggest the probable level of accuracy. A simulation study of the building formula carried out for the National Federation of Building Trades Employers²⁰ suggested that the proportion of actual extra costs recovered by the contractor would vary such that it was within the range 85%-115% of the average in no more than two cases out of three. This figure was

derived for the original 34 index version of the building formula which, when applied at the main contractor level, was intrinsically more accurate than the Baxter formula.

72. In § 64 the Authors claim that one of the ways in which the use of method-related charges as provided for by the Civil Engineering Standard Method of Measurement (CESMM) is advantageous to employer and contractor is that it achieves a close match between the contractor's in and out cash-flows. This conclusion can be reinforced by observing that the contractor's net cash-flow is stabilized in this way. The argument set out in §§ 54–60 probably understates the case. A stabilized and less sensitive cash lock-up can be more beneficial than an increase in internal rate of return (i.r.r.) or net present value (n.p.v.).

73. The Authors commend the use of cost modelling techniques for making predictions of a semi-research nature such as those which are well demonstrated by the Paper. Engineers and contractors are also finding that cost modelling is helpful in the management of projects during inflationary periods. Amongst other things it provides cash-flow forecasts as a by-product of estimating and cost control procedures.²¹

Professor R. Pilcher, University of Manchester Institute of Science and Technology
I would like to raise a number of points concerning the Authors' comments on inflation related to project appraisal.

75. The Authors' examples illustrating the increases in expenditure with escalation rate are necessarily over-simplified. The results are exactly as one would expect them to be in the artificial conditions which are used. I would like to ask the Authors for their justification in drawing the general conclusion that 'the longer the duration of the project/contract the more it is influenced by changes in the rate of inflation'? This may be true in specific cases but it is not necessarily so; it depends very much on the sequence and the pattern of changes in the rate of inflation.

76. I am assuming by *more*, the Authors' were thinking of financial units and did not mean *longer*. In addition, the general conclusion concerning a 5 year project having its base date value doubled is not an extreme, except in their own example. As such it is likely to be misleading (and frightening) in the context of many current projects.

77. Why do the Authors believe that the n.p.v. has no absolute meaning in money terms? In this they are at variance with the generally accepted interpretation of n.p.v. that it represents the anticipated future capital gain from investing in the project, a view supported by Merrett and Sykes.³

78. Calculation of the i.r.r. for a project does suffer from the defect of multiple returns, as the Authors briefly describe. However, in practice, this happens less frequently than is generally supposed. It is unfortunate, however, that the cause of the phenomenon is usually the occurrence of relatively large negative cash flows occurring late in, or at the end of, a project's life. This typically happens in a number of civil engineering projects such as open-cast mining, where reinstatement takes place before completion of the work.

79. Clearly, fluctuating cash flows can give rise to multiple returns (so long as some of them are negative) but could the Authors please enlarge on their premise that this situation over a relatively short period makes i.r.r. unreliable for reasons other than that above. In particular, can they explain how short is 'short'?

80. An important influence on project appraisal when undertaken in conditions of relatively high and variable inflation is the nature of the generating source of positive cash flow. The problem of inflation is certainly less acute in investments made in manufacturing industry or some public utilities, where the unitary size of the product is small (a kW of electricity, for example) and there is relative freedom to increase the price of the unit to the purchaser at short notice. It is unfortunate that it is rarely possible to monitor accurately the return on an investment against the original appraisal that resulted in the investment going forward. Perhaps the Authors have been able to achieve some practical results in this respect, particularly where an organization is investing in a group of projects more or less simultaneously, rather than a single project.

Mr E. L. Barron, Peter Fraenkel and Partners

Regarding the conclusion in § 52(e), I can see no need to modify the contract price fluctuation (CPF) clause in the ICE Conditions, for the following reasons.

82. According to Abrahamson,²² 'the wording of the present clause as a whole is against applying different index figures to the relevant portions of the effective value (although clause 1(2) says that the singular includes the plural where the context requires)'. So it is far from clear that different index figures are precluded and in any case he suggests that the employer would be entitled to claim back any extra paid under this clause because of delay by the contractor in making a claim by not fulfilling clause 54(4).

83. Claims for additional payment rarely include rates and prices to which the CPF clause would apply. Such work is usually covered by a variation order without notice of claim under clause 54 (4).

84. When rates and prices to which the CPF clause would apply are involved, payment for most of the claim can and should be made within a few months to comply with the last sentence of clause 54(4)(f), so the amounts involved will, after taking into account interest on delayed payment, usually be too small to merit retrospective adjustment.

85. Guidance Note 2B of the Conditions of Contract Standing Joint Committee (CCSJC) recommends that the ICE Conditions 1-71 are best incorporated unaltered. This implies that some alteration to the additional CPF clause may be expected, but a modification as suggested by the Authors would best be made (if desirable) by the CCSJC rather than left to individuals. In any case, it would be useful if the CCSJC could issue a guidance note regarding timely payment of claims to avoid the contractor gaining or losing unjustly.

Messrs Perry and Thompson

We are grateful to **Dr Barnes** for amplifying some of our statements concerning contract price adjustment. He states in § 68 that the non-adjustable element in the Baxter and Osborne formulae may be equated to a contractor's profit: if this view is held, then surely the current 10% level is too high.

87. The concept that a contractor should carry a significant part of the inflation risk might also be challenged. In reality the retention of a non-adjustable element does not necessarily achieve the pegging of a contractor's income, as he is free to make allowance for this shortfall in his price. The overall effect is to increase the uncertainty associated with pricing a tender. Whether a formula, which is not only applied to government contracts, should be an instrument for the enforcement of temporary political policy is also open to dispute. These factors appear to the Authors to strengthen the case for abolition of the non-recoverable element.

88. Referring to § 69, we believe that a contractor has a better than random chance of success when forecasting the likely difference between index movement and interest charges. He does not need to predict the actual difference: if the movement rate of the indices is greater than the cost of capital it will be beneficial to him to delay his claim. It is only necessary for him to ascertain this relationship over a relatively short period. A far more serious effect on the finances of both parties to the contract arises when claims settlements are delayed substantially beyond the contractual date, as CPF adjustment terminates at this date. It is perhaps relevant to note that according to the Wood Report,²³ the final accounts of 11% of public sector projects of value exceeding £1 million remain unsettled 2 years after contract completion.

89. We agree with Dr Barnes's statement (§ 70) that the Baxter formula is intrinsically less accurate than Osborne and that simulation methods are the only practicable way of assessing this accuracy. However, we would emphasize that the cost of administration of the Osborne formula is considerably greater than for Baxter, due primarily to the need to calculate the coefficients each month and also to the greatly increased number of indices (now 48 in the full version of Osborne compared with the usual 11 for Baxter). Indeed, at least one client believes that the cost of applying the Osborne formula is as

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great as for the old variation of price method. The use of a greater number of indices for any job does not necessarily mean that greater accuracy will be achieved when adjusting the contract price. What is more important is that the coefficients selected do realistically reflect the significance of each type of work. We believe that this is best achieved when the contractor sets the coefficients. In the absence of specific evidence which shows that the Baxter formula is consistently and unacceptably crude, we advocate the retention of the formula in its present simple form.

90. We wholeheartedly support the use of method-related charges; not only do they give benefits in an inflationary situation but their use simplifies almost every aspect of contract finance.

91. **Professor Pilcher** challenges our conclusion in § 7(a). We believe that changes in the rate of inflation do have a greater influence in projects/contracts of long duration. Prediction of the likely rate of inflation becomes more difficult as the time scale increases, and discrepancies between predicted and actual cost generate a greater element of uncertainty.

92. Referring to his comments in § 76, the aspect which alarms and greatly concerns us is that the engineer may not have performed these simple calculations and may therefore be unaware of the range of variation in final price which could occur. We advocate that, for any contract, sensitivity analysis should be performed to inform the client/contractor on this point. Our experience of risk analysis, including the risks associated with inflation, for overseas contracts has confirmed the value of this approach.

93. The Authors are not at variance with Merrett and Sykes³ over the meaning of net present value. The problem raised in § 77 by Professor Pilcher highlights misconception over interpretation of terms, which we have found to be particularly prevalent when considering n.p.v. Discounting techniques, especially n.p.v., are predominantly comparative tools for discriminating between alternative investments. The Authors' use of the word 'absolute' was intended to imply a cash sum as is quantified by the terms 'lock-up' or 'profit'. It can be very misleading to view net present value in this way.

94. The unreliability of the i.r.r. calculation (§ 21 and § 79) in contracts of short duration is certainly related to the occurrence of both large positive cash flows at the beginning of a contract and negative cash flows late in the contract. Our experience has been that in contracts having a duration of less than 1 year, with fluctuating cash flows calculated on a weekly basis, the resulting values for i.r.r. can be both exaggerated and variable.

95. We agree with Professor Pilcher that there is a need for realism in forecasting the escalation of revenues and costs. These are quite likely to escalate at different rates and the effect is demonstrated by Carsberg and Hope⁷ who highlighted the danger of using constant prices to avoid the accepted difficulties of appraisal under inflationary conditions. The Authors are currently involved in a study with a firm in the chemical industry which includes monitoring project appraisal in the way described in § 80. In the course of another study for the World Bank, which involves the use of discounting techniques for bid evaluation, we have become aware that this organization also carries out post-investment audits on a n.p.v. basis.

96. **Mr Barron** seeks support from Abrahamson²² to suggest that different index figures may be applied to relevant portions of the effective value (EV). However, Abrahamson states that the CPF clause has a defect in this respect and he generally concurs with the view expressed by the EDC for Civil Engineering¹⁴ albeit in a guidance-only publication. If there is a defect, or lack of clarity, then we submit the best remedy is to modify the clause.

97. If there are any cases of claims where CPF is applied to rates and prices, then we believe this warrants the clause being clear and equitable in intent. The evidence we have is that such cases do occur and the amount of money involved may be substantial, thus involving the client/engineer in unusual action to mitigate the defects of the clause (§ 40).

98. We agree that modifications are best made by CCSJC but this should not

preclude individual clients or engineers from making a desirable change, as they frequently do with other clauses in the general conditions of contract. Legal advice should always be sought on the precise wording of modifications.

References

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