OPINION OF LORD DRUMMOND YOUNG. OUTER HOUSE, COURT OF SESSION. 30th November 2007

[1] The pursuers and the defenders are respectively the employer and the contractor under a contract dated 15 October and 11 November 1998 for the construction of a hotel at Temple Way, Bristol. The contract incorporates the conditions of the Standard Form of Building Contract (Private Edition with Quantities) (1980 edition) together with a substantial number of additional provisions, including an Abstract of Conditions and a Schedule of Amendments specially prepared for the purposes of the contract. The contractual completion date specified in the Abstract of Conditions was 25 January 1999. In terms of clause 24 of the Conditions of Contract and the Abstract of Conditions liquidate and ascertained damages were payable at the rate of £30,000 per week for the period between the completion date and the date of practical completion. Initially the architect was RMJM Scotland Limited. That firm also acted as structural engineer and mechanical and electrical engineer. On 2 December 1998, however, RMJM was dismissed and Keppie Architects was appointed as contract architect. At the same time Blyth & Blyth was appointed as structural engineer and mechanical and electrical engineer.

[2] The date of possession specified in the Abstract of Conditions was 26 January 1998, and the defenders took possession of the site on or about that date. Thereafter works proceeded. On 27 April 1999 Keppie Architects, who at that time were the contract architect, issued a certificate of practical completion certifying that practical completion of the works had been achieved on 29 March 1999. On 9 June 1999 the architect issued a certificate revising the completion date to 22 February 1999. On the same date the architect issued a certificate of non-completion certifying that the defenders had failed to complete the works by the completion date. The result of those certificates was that the defenders were awarded a four-week extension of time but, in terms of clause 24 of the Conditions of Contract, the pursuers were entitled to deduct liquidate and ascertained damages for the five-week period from 23 February 1999 (the revised completion date) to 29 March 1999 (the date of practical completion) at a weekly rate of £30,000. On that basis of the pursuers deducted £150,000 from monies due to the defenders.

[3] Thereafter certain disputes arising between the parties were referred to adjudication. The adjudicator, Mr John D Spencely, determined that the defenders were entitled to a further five-week extension of time and directed the pursuers to repay them the sum of £150,000. That determination is not, of course, conclusively binding, and the matters argued before the adjudicator fall to be determined in the present proceedings as if no determination had been made by the adjudicator. The pursuers contend that the defenders are not entitled to any extension of time beyond the contractual completion date, 25 January 1999. They make this contention on two distinct bases. First, they rely on the terms of clause 13.8 of the contract conditions, which is one of the special amendments added by the parties. That clause, in summary, provides that when an architect's instruction is liable to delay the completion date, the contractor is not to execute the instruction without following certain defined procedures. If the contractor fails to do so, he is not entitled to any extension of time. The pursuers submit that the defenders did not follow the procedures specified in clause 13.8, and are accordingly, for that reason alone, not entitled to any extension of time. Secondly, the pursuers contend that as a matter of fact none of the instructions issued by the architect caused any delay in completion. As a secondary argument they submit that, if any delays were caused by architect's instructions, those delays were concurrent with delays arising from matters that were the defenders' fault; as a result it is contended that the defenders are not entitled to any extension of time.

[4] The defenders contend that they are entitled to an extension of time of 11 weeks in total, with the result that the contractual completion date should be fixed at 14 April 1999. That period of 11 weeks is broken down as follows. First, it is said that a delay of three and half weeks was caused by the late issue of an architect's instruction varying the form of gas membrane incorporated into the substructure of the hotel. Secondly, it is said that a delay of five weeks beyond the contractual Completion Date was caused by the late issue of an architect's instruction varying the roof cladding of the hotel from the built-up system on which the contract was based to an alternative system known as the Stramit Speedeck system; three and a half weeks of that period are said to have been concurrent with the foregoing three-week delay. Thirdly, it is said that a six-week delay was caused, following the dismissal of the original design team by the pursuers in November 1998, by the late issue of a significant number of instructions for variations and additional work and late confirmation of details in the work. In relation to clause 13.8 of the contract, the defenders contend that it only has application to instructions that are liable to cause delay because of their content; it has no application to instructions that are liable to cause delay simply because they are issued too late for the contractor's programme. In the present case, it is said, the delays were with one exception caused by the lateness of the architect's instructions, not by their content. In addition, the defenders contend that in the circumstances of the contract the pursuers in part, through the actings of the contract architect, have waived compliance with clause 13.8, or alternatively that the pursuers are personally barred from relying on clause 13.8. The pursuers dispute the defenders' construction of clause 13.8; they submit that the distinction between the lateness and the content of instructions is not well founded. They further contend that no waiver or personal bar occurred in the circumstances of the case. In addition, they contend that the system of roof cladding specified in the contract was not the built-up system claimed by the defenders but was rather the Stramit Speedeck system. The result is that the architect's instruction to use the Stramit Speedeck system was not a variation and does not give rise to a claim for an extension of time.

[5] Against the foregoing background, the pursuers have raised the present action in which they conclude for a range of remedies. First, they seek declarator that the Completion Date is 25 January 1999 and that the defenders were not entitled to the four-week extension granted by the architect. On that basis they conclude for reduction of the Certificate of Notification of Revision to Completion Date issued by Keppie Architects on 9 June 1999; that

was the document through which the architect granted the four-week extension. They further conclude for payment of liquidate and ascertained damages in terms of clause 24.2 of the Conditions of Contract; those are said to be due in respect of the period from 25 January 1999 to 29 March 1999, and amount to £270,000 in total. The pursuers further seek partial reduction of two Interim Certificates, Nos 19 and 21, issued by Keppie Architects on 25 February 2000 and 13 July 2001, and repetition of the amounts that are said to have been erroneously paid to the defenders in terms of those two certificates; those amounts total £121,811.39, inclusive of value added tax. The defenders have lodged a counterclaim in which they seek declarator that they are entitled to an extension of time of 11 weeks, with the Completion Date accordingly being 14 April 1999. Consequentially, they seek reduction of the Certificate of Notification of Revision to Completion Date issued by Keppie Architects on 9 June 1999 and reduction of the Certificate of Non-Completion issued by Keppie Architects on the same date. Finally, the defenders seek payment of the (amended) sum of £27,069; that sum, they claim, is direct loss and expense suffered by them of which they are entitled to reimbursement under clause 26 of the Conditions of Contract. That sum represents two weeks' prolongation costs, and it recognizes that the adjudicator has already made an award of prolongation costs for nine of the 11-week extension of time claimed by the defenders.

[6] After a period of adjustment the action proceeded to a debate before Lord Macfadyen (reported at 2002 SLT 781). That debate covered a number of issues arising out of the parties' pleadings. For present purposes it is sufficient to note that Lord Macfadyen considered the construction of clause 13.8 of the contract conditions. He concluded that it applied to late instructions which because of their content gave rise to a need to adjust the contract sum or to grant an extension of time, but that it did not apply to late instructions which, merely because of their lateness, gave rise to a need to adjust the contract sum or grant an extension of time. I refer to this issue further at paragraphs [140]-[144]. A reclaiming motion was marked against Lord Macfadyen's decision. This was heard by the Second Division and was refused (reported at 2003 SLT 885), although the decision proceeded to some extent on different grounds. The reclaiming motion did not, however, cover the question of whether clause 13.8 extended to late instructions which because of their lateness gave rise to a need for an adjustment of the contract sum or an extension of time.

[7] I intend to begin by setting out the contractual provisions that govern the parties' claims and considering the proper approach to the construction of such a contract. Thereafter I will deal with the evidence that was led, first in general terms and thereafter in relation to each of the three matters relied on by the defenders in order to justify an extension of time. Those three matters are: first the architect's instruction given on 23 March 1998 to use an alternative form of gasproof membrane; secondly the instructions given by the architect in relation to the roof steelwork and roof coverings; and thirdly the series of instructions issued by Keppie Architects after they became contract architect on or about 2 December 1998. After considering the justification for an extension of time, I will consider the construction of clause 13.8, and the issues of waiver and personal bar that arise in relation to that clause, in order to determine whether the defenders are entitled to an extension. Finally, I will consider the defenders' claim in the counterclaim for direct loss and expense that is alleged to have been caused by the various architect's instructions.

The relevant contractual provisions

[8] The parties' contract incorporates the conditions of the Standard Form of Building Contract (Private Edition with Quantities) (1980 edition), subject to a substantial number of amendments. Clause 24.1 of that form of contract states that if the Contractor fails to complete the Works by the Completion Date then the architect shall issue a certificate to that effect. Clause 24.2.1 provides for the payment of liquidated and ascertained damages in the event that the Contractor fails to complete the Works by the Completion Date; these are payable for the period between the Completion Date and the date of Practical Completion. The parties fixed the amount of liquidated damages at £30,000 per week.

[9] This is, however, subject to the power of the architect to grant an extension of time under clause 25. Clause 25.2.1.1 provides as follows:

"If and whenever it becomes reasonably apparent that the progress of the Works is being or is likely to be delayed the Contractor shall forthwith give written notice to the Architect of the material circumstances including the cause or causes of the delay and identify in such notice any event which in his opinion is a Relevant Event".

Clause 25.3.1 then provides:

"If, in the opinion of the Architect, upon receipt of any notice, particulars and estimate under clauses 25.2.1.1 and 25.2.2,

.1 any of the events which are stated by the Contractor to be the cause of the delay is a Relevant Event and

.2 the completion of the Works is likely to be delayed thereby beyond the Completion Date the Architect shall in writing to the Contractor give an extension of time by fixing such later date as the Completion Date as he then estimates to be fair and reasonable. The Architect shall, in fixing such new Completion Date, state:

.3 which of the Relevant Events he has taken into account and

.4 the extent, if any, to which he has had regard to any instruction under clause 13.2 requiring as a Variation the omission of any work issued since the fixing of the previous Completion Date, ...".

Clause 25.3.3 further provides as follows:

"After the Completion Date, if this occurs before the date of Practical Completion, the Architect may, and not later than the expiry of 12 weeks after the date of Practical Completion shall, in writing to the Contractor ...

.1 fix a Completion Date later than that previously fixed if in his opinion the fixing of such later Completion Date is fair and reasonable having regard to any of the Relevant Events, whether upon reviewing a previous decision or otherwise and whether or not the Relevant Event has been specifically notified by the Contractor under clause 25.2.1.1...".

Relevant Events are specified in clause 25.4 (see clause 1.3). So far as material clause 25.4 provides as follows:

"The following are the Relevant Events referred to in clause 25: ...

.5 compliance with the Architect's instructions

5.1 under clauses... 13.2, 13.3 (except compliance with an Architect's instruction for the expenditure of a provisional sum for defined work)... ...

.6 the Contractor not having received in due time necessary instructions (including those for or in regard to the expenditure of provisional sums), drawings, details or levels from the Architect for which he specifically applied in writing provided that such application was made on a date which having regard to the Completion Date was neither unreasonably distant from nor unreasonably close to the date on which it was necessary for him to receive the same".

Clauses 13.2 and 13.3 deal respectively with variations and the expenditure of provisional sums.

[10] Clause 26 makes provision for loss and expense caused to the Contractor by matters materially affecting regular progress of the Works. Clause 26.1 is in the following terms:

"If the Contractor makes written application to the Architect stating that he has incurred or is likely to incur direct loss and/or expense in the execution of this Contract for which he would not be reimbursed by a payment under any other provision in this Contract ... because the regular progress of the Works or of any part thereof has been or is likely to be materially affected by any one or more of the matters referred to in clause 26.2; and if and as soon as the Architect is of the opinion... that the regular progress of the Works or of any part thereof has been or is likely to be so materially affected as set out in the application of the Contractor then the Architect from time to time thereafter shall ascertain... the amount of such loss and/or expense which has been or is being incurred by the Contractor; provided always that:

1. *the Contractor's application shall be made as soon as it has become, or should reasonably have become, apparent to him that the regular progress of the Works or of any part thereof has been or was likely to be affected as aforesaid, and*
2. *the Contractor shall in support of his application submitted to the Architect upon request such information as should reasonably enable the Architect to form an opinion as aforesaid, and*
3. *the Contractor shall submit to the Architect... upon request such details of such loss and/or expense as are reasonably necessary for such ascertainment as aforesaid ".*

Clause 26.2 provides as follows:

"The following are the matters referred to in clause 26.1:

.1 the Contractor not having received in due time necessary instructions (including those for or in regard to the expenditure of provisional sums), drawings, details or levels from the Architect for which he specifically applied in writing provided that such application was made on a date which having regard to the Completion Date was neither unreasonably distant from nor unreasonably close to the date on which it was necessary for him to receive the same; ...

.7 Architect's instructions issued

under clause 13.2 requiring a Variation or

under clause 13.3 in regard to the expenditure of provisional sums... ...".

Interpretation of clauses 24 and 25: general considerations

[10] The effect of provisions such as are found in clauses 24 and 25 of the present JCT Standard Form was set out by Lord Fraser of Tullybelton in ***Percy Bilton Ltd v Greater London Council***, [1982] 1 WLR 794, at 801:

"1. ...The general rule is that the main contractor is bound to complete the work by the date for completion stated in the contract. If he fails to do so, he will be liable for liquidated damages to the employer.

2. That is subject to the exception that the employer is not entitled to liquidated damages if by his acts or omissions he has prevented the main contractor from completing his work by completion date....

3. These general rules may be amended by the express terms of the contract.

4. In this case, the express terms of clause 23 of the contract [corresponding to the present clause 25] do affect the general rule. For example, where completion is delayed '(a) by force majeure, or (b) by reason of any exceptionally inclement weather' the architect is bound to make a fair and reasonable extension of time for completion of the work. Without that express provision, the main contractor would be left to take the risk of delay caused by force majeure or exceptionally inclement weather under the general rule".

Although these remarks relate to the 1963 JCT Standard Form, the general approach described that passage is equally applicable to the 1980 version of the contract. It follows that the extension of time provisions such as are found now in clause 25 are of critical importance in ensuring that the contractor is not subjected to liquidated damages for events that are outwith his control.

[11] Such clauses are important for a further reason. Under the JCT Standard Forms the employer is entitled to liquidated and ascertained damages in the event that the contractor fails to complete the works in time; in the

present case such a provision is found in clause 24 of the contractual conditions. Such clauses are construed strictly, and if the contractor is prevented from completing in time through the actings of the employer the liquidated damages clause will be the treated as inapplicable. This point was made by Salmon LJ in ***Peak Construction (Liverpool) Ltd v McKinney Foundations Ltd,*** [1970] BLR 111, at 121:

"A clause giving the employer liquidated damages at so much a week or month which elapses between the date fixed for completion and the actual date for completion is usually coupled, as in the present case, with an extension of time clause. The liquidated damages clause contemplates a failure to complete on time due to the fault of the contractor. It is inserted by the employer for his own protection; for it enables him to recover a fixed sum as compensation for delay instead of facing the difficulty and expense of proving the actual damage which the delay may have caused him. If the failure to complete on time is due to the fault of both the employer and the contractor, in my view the clause does not bite. I cannot see how, in the ordinary course, the employer can insist on compliance with a condition if it is partly his own fault that it cannot be fulfilled.... I consider that unless the contract expresses a contrary intention the employer, in the circumstances postulated, is left to his ordinary remedy; that is to say, to recover such damages as he can prove flow from the contractor's breach. No doubt if the extension of time clause provided for the postponement of the completion date on account of delay caused by some breach of fault on the part of the employer, the position would be different. This would mean that the parties had intended the employer could recover liquidated damages notwithstanding that he was partly to blame for the failure to achieve the completion date. In such a case the architect would extend the date for completion, and the contractor would then be liable to pay liquidated damages for delay as from the extended completion date.

The liquidated damages and extension of time clauses in printed forms of contract must be construed strictly contra proferentem. If the employer wishes to recover liquidated damages for a failure by the contractors to complete on time in spite of the fact that some of the delay is due to the employer's own fault or breach of contract, any extension of time clause should provide, expressly or by necessary inference, for an extension on account of such fault or breach on the part of the employer".

Salmon LJ refers to fault or breach of contract on the part of the employer. Nevertheless, it is clear that his analysis applies equally to cases where the employer, through the contract architect, instructs a variation. A further point is of some significance. It seems implicit in Salmon LJ's analysis that an extension of time should still be available in cases where delay has been caused partly by the fault of the contractor and partly by the fault of the employer; reference is made to the employer's being "partly" to blame for the failure to achieve the completion date. The precise approach that should be followed in cases where delay is caused by concurrent causes, one of which is the fault of the contractor and one of which is not, is a matter of some importance in this case, and I return to it below.

[12] The general approach to the interpretation of clause 25 was the subject of detailed discussion by Colman J. in ***Balfour Beatty Building Ltd v Chestermount Properties Ltd***, 1993, 62 BLR 1, at 25:

"[I]t is right to examine the underlying contractual purpose of the completion date/extension of time/liquidated damages regime. At the foundation of this code is the obligation of the contractor to complete the works within the contractual period terminating at the completion date and on failure to do so to pay liquidated charges for the period of time by which practical completion exceeds the completion date. But superimposed on this regime is a system of allocation of risk. If events occur which are non-contractor's risk events and those events caused the progress of the works to be delayed, in as much as such delay would otherwise cause the contractor to become liable for liquidated damages or for more liquidated damages, the contract provides for the completion date to be prospectively or, under clause 25.3.3, retrospectively, adjusted in order to reflect the period of delay so caused and thereby reduce pro tanto the amount of liquidated damages payable by the contractor. Likewise, if the works are reduced by an omission instructed by the architect it may be fair and reasonable to reduce the contract period for completion prospectively or retrospectively and therefore to advance the completion date. In view of the inherent difficulties in predicting with precision the impact on the progress of the works of non-contractor's risk events, particularly when operating simultaneously with contractor's risk events the architect is given a power of retrospective adjustment of the completion date. The underlying objective is to arrive at the aggregate period of time within which the contract works as ultimately defined ought to have been completed having regard to the incidence of non-contractor's risk events and to calculate the excess time if any, over that period, which the contractor took to complete the works. In essence, the architect is concerned to arrive at an aggregate period for completion of the contractual works, having regard to the occurrence of non-contractor's risk events and to calculate the extent to which the completion of the works has exceeded that period".

A further issue arose in the same case, namely whether in fixing a the new completion date under clause 25 the architect should ignore the previous completion date and start his assessment of the extension of time from the date when the variation instruction was given, or should start with the existing completion date and postpone it to the extent considered fair and reasonable having regard to the delay caused by the requirement to execute the variation instructions. Colman J. favoured the latter approach (described as a *"net"* method). He said (at page 29):

"[O]ne again returns to the purpose of the architect's powers under clause 25. He looks back after the most recently-fixed completion date and, under clause 25.3.3, perhaps after practical completion, assesses the extent to which the period of contract time available for completion ought to be extended or reduced having regard to the incidence of the relevant events. His yardstick is what is fair and reasonable. For this purpose he will take into account amongst other factors the effect that the relevant event had on the progress of the works. Did it bring the progress of the works to a standstill? Or did it merely slow down the progress of the works? The function which he performs under

clause 25.3.3 must as a matter of construction be in substance exactly analogous to that which he performs under clause 25.3.1. The difference is that under the former clause he does it after the completion date and not before it. But in both cases his objective must be the same: to assess whether any of the relevant events has caused delayed to the progress of the works and, if so, how much. He must then apply the result of his assessment of the amount of delay caused by the relevant events by extending the contract period for completion of the works by a like amount and this he does by means of postponing the completion date.

It will be perfectly obvious that unless the amount of time by which he postpones the completion date corresponds with the amount of delay time caused by the relevant events, the contractor will become potentially or actually liable for an amount of liquidated damages commensurate with a period which does not correspond with the amount of delay beyond the previously fixed completion date attributable to events of which he takes the risk under the contract".

[13] The foregoing discussion of clause 25 was described as a "valuable interpretation" by Dyson J in ***Henry Boot Construction (UK) Ltd v Malmaison Hotel (Manchester) Ltd,*** 1999, 70 Con LR 32 at paragraph 12. Certain features of the discussion are noteworthy. First, the scheme of sections 24 and 25 recognizes an allocation of risk: the contractor is bound to complete the works by the completion date except to the extent that delay is caused by events that are not at the contractor's risk. In general, as can readily be seen from the terms of clause 25.4, these are either events such as inclement weather which are extraneous to both parties or are events such as a variation which originate in a decision of the employer or the architect; the architect is for this purpose the employer's agent. Secondly, the architect's objective is to estimate the period within which the contract works as ultimately defined ought to have been completed, having due regard to the occurrence of non-contractor's risk events. The completion date is extended by that amount. Thirdly, this process involves certain inherent uncertainties. For example, a contractor's risk event and a non-contractor's risk event may operate concurrently in such a way that delay can be said to result from both, or indeed either. Another possibility is that a non-contractor's risk event merely slows the progress of the works, rather than bringing them to a halt. Because of these uncertainties, the architect is given power to adjust the completion date retrospectively, because it is clearly only with hindsight that the causative potency of each of the sources of delay can be properly assessed. Fourthly, the inherent uncertainties in the process are recognized in the scheme of clause 25. The architect is not expected to use a coldly logical approach in assessing the relative significance of contractor's risk events and non-contractor's risk events; instead, as the wording of both clause 25.3.1 and clause 25.3.3.1 makes clear, the architect is to fix such new completion date as he considers to be "fair and reasonable". That wording indicates that the architect must look at the various events that have contributed to the delay and determine the relative significance of the contractor's and non-contractor's risk events, using a fairly broad approach. Judgment is involved. It is probably fair to state that the architect exercises discretion, provided that it is recognized that the architect's decision must be based on the evidence that is available and must be reasonable in all the circumstances of the case. The decision must, in addition, recognize that the critical question is to determine the delay caused by non-contractor's risk events, and to extend the completion date accordingly. Fifthly, the completion date as so adjusted is not to be fixed without reference to the original completion date; instead, as Colman J. points out in the second of the passages quoted above, it is fixed by extending the contract period by an amount that corresponds to the delay attributable to the non-contractor's risk events.

[14] Further authority on the application of clause 25 is found in ***Henry Boot Construction (UK) Ltd v Malmaison Hotel (Manchester) Ltd,*** *supra*. In that case Dyson J., after referring to the analysis of Colman J. in ***Balfour Beatty,*** continued:

"13. *[I]t is agreed that if there are two concurrent causes of delay, one of which is a relevant event, and the other is not, then the contractor is entitled to an extension of time for the period of delay caused by the relevant event notwithstanding the concurrent effect of the other event. Thus, to take a simple example, if no work is possible on a site for a week not only because of exceptionally inclement weather (a relevant event), but also because the contractor has a shortage of labour (not a relevant event), and if the failure to work during that week is likely to delay the works beyond the completion date by one week, then if he considers it fair and reasonable to do so, the architect is required to grant an extension of time of one week. He cannot refuse to do so on the grounds that the delay would have occurred in any event by reason of the shortage of labour. ...*

15 *It seems to me that it is a question of fact in any given case whether a relevant event has caused or is likely to caused delay to the works beyond the completion date in the sense described by Colman J. in the Balfour Beatty case. In the present case, the [employer] has... both a negative and a positive defence to the [extension of time] claim. The negative defence amounts to saying that the variations and late information etc relied on by the claimant did not cause any delay because the activities were not on the critical path, and on that account did not cause delay. The positive defence is that the true cause of the delay was other matters, which were not relevant events, and for which the contractor was responsible. In my view the respondent is entitled to advance these other matters by way of defence to the [extension of time] claim. It is entitled to say (a) the alleged relevant event was not likely to or did not cause delay e.g. because the items of work affected were not on the critical path, and (b) the true cause of the admitted delay in respect of which the claim for an extension of time is advanced was something else. The positive case in (b) supports and fortifies the denial in (a). The respondent could limit its defence to the claim by relying on (a), but in my view there is nothing in cl 25 which obliges it to do so. Likewise, when considering the matter under the contract, the architect may feel that he can decide the issue on a limited basis, or he may feel that he needs to go further, and consider whether a provisional view reached on the basis of one set of facts is supported by findings on other issues. It is impossible to lay down hard and fast rules. In my judgment, it is incorrect to say that, as a matter of construction of clause 25, when deciding whether a relevant*

event is likely to cause or has caused delay, the architect may not consider the impact on progress and completion of other events".

[15] Two important points emerge from these remarks. In the first place, in the application of clause 25, a relevant event may still be taken into account even though it operates concurrently with another matter that is not a relevant event. In other words, the "but for" rule of causation, that an event A will only be a clause of a result B if B would not have occurred but for A, has no application. In the example given by Dyson J. in paragraph 13, the delay would have occurred as a result of the shortage of labour by itself, regardless of the bad weather. On the approach to causation found in the general law of contract and delict, it could not be said that the bad weather caused the delay because the delay would have occurred in any event. Under clause 25, however, the architect may take the bad weather into account to the extent that he considers it fair and reasonable to do so. This perhaps emphasizes the general notion underlying clause 25, that it is designed to an achieve fairness as between the contractor and the employer, and the architect is given a reasonably wide discretion in order to achieve that result. In the second place, despite the width of the discretion given to the architect, before he can take any particular occurrence into account as a relevant event for the purposes of clause 25, he must be satisfied that the occurrence was a cause of the delay in completing the contract. This is illustrated by the example given in paragraph 15 of Dyson J.'s opinion.

[16] Dyson J.'s opinion in ***Henry Boot Construction (UK) Ltd v Malmaison Hotel (Manchester) Ltd*** was considered by Judge Richard Seymour QC in ***Royal Brompton Hospital NHS Trust v Hammond (No 7),*** **(2001)** 76 Con LR 148, at paragraph 31. In that passage Judge Seymour gave a further explanation of what is meant by "*events operating concurrently*". He drew a distinction between on one hand a case where work has been delayed through a shortage of labour and a relevant event then occurs and on the other hand a case where works are proceeding regularly when both a relevant event and a shortage of labour occur, more or less simultaneously. Judge Seymour considered that Dyson J. had only been concerned with the latter situation, and not with the former; in the former situation the relevant event had no effect upon the completion date. I have some difficulty with this distinction. It seems to turn upon the question whether the shortage of labour and the relevant event occurred simultaneously; or at least it assumes that the shortage of labour did not significantly predate the relevant event. That, however, seems to me to be an arbitrary criterion. It should not matter whether the shortage of labour developed, for example, two days before or two days after the start of a substantial period of inclement weather; in either case the two matters operate concurrently to delay completion of the works. In my opinion both of these cases should be treated as involving concurrent causes, and they should be dealt with in the way indicated in clause 25.3.1 by granting such extension as the architect considers fair and reasonable.

[17] It is in any event clear from older authority that the fact that delay has been caused by matters for which the contractor is responsible will not deprive the contractor of his right to claim an extension of time for delay caused by a relevant event. That is essentially the ratio of ***Wells v Army and Navy Co-operative Society,*** 1903, 86 LT 764. A more modern statement of this principle is found in ***S.M.K. Cabinets v Hili Modern Electrics Pty Ltd,*** [1984] VR 391, a decision of the Supreme Court of Victoria. In that case, Brooking J., whose opinion was concurred in by the other judges of the court, stated (at 398):

"The sole remaining matter is that of the soundness of the ground on which the arbitrator in fact rejected the defence of prevention [that is, acts of the employer that prevent the contractor from completing on time]. He evidently considered that where acts or omissions of a proprietor do in fact substantially delay completion, the proprietor nonetheless cannot be sent to have prevented the contractor from completing by the relevant date unless the contractor would have been able to complete by that date had it not been for the supposed prevention.... But it has been accepted for more than one hundred years that this is not the law. The cases are all one way".

Cases were then cited from Australia, England, New Zealand and Canada; these included *Wells*. In relation to *Wells*, Brooking J. said (at 399):

"The principle of the decision is not as clear as one would wish, but appears to be that if the supposed prevention was such as would in ordinary circumstances have made it impossible for the contractor to complete in time, then prevention has in law occurred, notwithstanding that the contractor may in fact have disabled himself by his own delays from completing by the due date".

[18] While delay for which the contractor is responsible will not preclude an extension of time based on a relevant event, the critical question will frequently, perhaps usually, be how long an extension is justified by the relevant event. In practice the various causes of delay are likely to interact in a complex manner; shortages of labour will rarely be total; some work may be possible despite inclement weather; and the degree to which work is affected by each of these causes may vary from day to day. Other more complex situations can easily be imagined. What is required by clause 25 is that the architect should exercise his judgment to determine the extent to which completion has been delayed by relevant events. The architect must make a determination on a fair and reasonable basis. Where there is true concurrency between a relevant event and a contractor default, in the sense that both existed simultaneously, regardless of which started first, it may be appropriate to apportion responsibility for the delay between the two causes; obviously, however, the basis for such apportionment must be fair and reasonable. Precisely what is fair and reasonable is likely to turn on the exact circumstances of the particular case. A procedure of that nature is in my opinion implicit in the wording of clause 25.3.1 and .3; both of these provisions direct the architect to give an extension of time by fixing a Completion Date that he considers to be fair and reasonable.

[19] The foregoing construction of clause 25 is in my opinion supported by the approach taken to concurrent causes of delay in Federal tribunals in the United States. In ***Chas. I. Cunningham Co.***, IBCA 60, 57-2 BCA P1541 (1957), the Board of Contract Appeals considered the legal consequences where a contractor has claimed for an extension of time but is himself in default. The main opinion of the Board, delivered by one of its members, Mr Slaughter, states the law as follows:

"It is well settled that the failure of a contractor to prosecute the contract work with the efficiency and expedition requisite for its completion within the time specified by the contract does not, in and of itself, disentitle the contractor to extensions of time for such parts of the ultimate delay in completion as are attributable to events that are themselves excusable, as defined in [the relevant extension of time clause, corresponding to clause 25]. Where a contractor finishes late partly because of a cause that is excusable under this provision and partly because of a cause that is not, it is the duty of the contracting officer to make, if at all feasible, a fair apportionment of the extent to which completion of the job was delayed by each of the two causes, and to grant an extension of time commensurate with his determination of the extent to which the failure to finish on time was attributable to the excusable one. Accordingly, if a event that would constitute a excusable cause of delay in fact occurs, and if that event in fact delays the progress of the work as a whole, the contractor is entitled to an extension of time for so much of the ultimate delay in completion as was the result or consequence of that event, notwithstanding that the progress of the work may also have been slowed down or halted by a want of diligence, lack of planning, or some other inexcusable omission on the part of the contractor".

This approach recognizes the fact that culpable and non-culpable causes of delay will frequently coexist and interact, and permits the contracting officer, equivalent to the architect under the JCT Forms, to apportion the delay between the culpable and non-culpable causes. That seems to me to be the only way in which a fair result can be achieved in such cases, and in my opinion such an approach is contemplated by the wording of clause 25. I should add that the decision of the Board of Contract Appeals in ***Chas. I. Cunningham Co.*** was followed **in *Sun Shipbuilding & Drydock Co.***, ANBCA 11300, 68-1 BCA (CCH) P7054 (1968).

[20] Counsel for the pursuers founded strongly on the opinion of the court in ***John Doyle Construction Ltd v Laing Management (Scotland) Ltd,*** 2004 SC 73. That case dealt with a claim for direct loss and expense under the equivalent of clause 26 of the JCT Standard Form 1980. It was concerned in particular with the way in which a contractor could establish a global claim, where it is impossible to demonstrate individual causal links between events for which the employer is responsible and particular items of loss and expense. Normally, when a global claim is pursued, the contractor must demonstrate that the whole of his loss and expense results from matters that are the responsibility of the employer. The court pointed out that that requirement might be mitigated in three ways. First, it may be possible to identify a causal link between particular events for which the employer is responsible and individual items of loss. Secondly, the question of causation must be treated by the application of common sense to the logical principles of causation, and if it is possible to identify an act of the employer as the dominant cause of the loss that will suffice. Thirdly, it may in some cases be possible to apportion the loss between the causes for which the employer is responsible and other causes. In my opinion these principles have only limited application to the present case. They are concerned with claims for loss and expense, and consequently may have some bearing on the defenders' claim for prolongation costs (see below, at paragraphs [162]-[167]). They do not, however, appear directly relevant to the granting of an extension of time. The contractual wording relating to an extension of time is different from that relating to claims for loss and expense. In particular, in the form of contract that is presently under consideration, there is no reference in clause 26 to the architect's making such award as is *"fair and reasonable*". For the reasons discussed above, I attach considerable importance to those words in the interpretation of clause 25, especially in its practical application. In addition, the conceptual structure of the two clauses is quite different, and the events that trigger an extension of time and a claim for loss and expenses are likewise distinct. Consequently I do not think that the decision in *John Doyle Construction* is of general assistance in the construction of clause 25, subject to one exception, which is discussed in the following paragraph. Perhaps the one theme that is common to clauses 25 and 26 is that a practical common sense approach should be adopted to the interpretation of building contracts, but it is hardly necessary to refer to authority for that proposition.

[21] In the course of their submissions counsel for the pursuers advanced a number of legal propositions. First, it was said that for a contractor to establish an entitlement to an extension of time in respect of delay arising out of a relevant event he must establish that the delay was caused by the relevant event, as opposed to any other pre-existing or concurrent matter for which the contractor himself is responsible; and he must establish the extent of such delay. In my opinion that proposition is too broadly stated. It is correct that the contractor must establish that delay was caused by a relevant event, and the extent of the delay; nevertheless, I am of opinion that concurrent causes should be treated in the manner discussed in paragraph [18] above. The second proposition advanced for the pursuers was that, if a relevant event can be shown to be the *"dominant or operative"* cause of a delay, the party responsible for that event will be held responsible for the delay. I agree that it may be possible to show that either a relevant event or a contractor's risk event is the dominant cause of that delay, and in such a case that event should be treated as the cause of the delay. A similar principle was recognized in *Doyle,* at paragraph [15] of the opinion of the court; the principle is derived from older case ***of Leyland Shipping Company Ltd v Norwich Union Fire Insurance Society Ltd***, [1918] AC 350. Those cases refer to the "dominant" or "proximate" cause. The pursuers' submission went further, and referred to the "dominant or operative" cause of the delay. In my opinion this extension is not legitimate. Indeed, I have difficulty in seeing what the word "operative" adds to the notion of

causation; a cause can only be relevant if it is operative, and that is as true of concurrent causes as it is of single or "dominant" causes.

[22] The pursuers' third proposition was that a variation instructed during a period when the contractor is already in delay will not absolve the contractor of responsibility for that pre-existing delay, unless it is proved that the delay resulted from the variation. As stated, this is correct. Nevertheless, the "delay" that matters is delay to the Completion Date. If the contractor is, through his own fault, in delay before a relevant event, that may explain delay that follows the Completion Date. Alternatively, it may be possible for the contractor to demonstrate that he would have made up the delay caused by his own fault, and that the delay beyond the Completion Date results from the variation. It is all a question of fact. The pursuers' fourth proposition was in two parts: first, it is a defence to a claim that a variation or late instruction caused delay to establish that the matter to which the variation or late instruction was issued was not on the critical path; secondly, it is also a defence that the claimed delay was in fact due to other events. The first of these contentions was not, I think, in dispute, although the parties were sharply in dispute as to where the critical path lay in the progress of the contractual works. The second contention, however, is perhaps stated rather simplistically. In practice causation tends to operate in a complex manner, and a delay to completion may be caused in part by relevant events and in part by contractor default, in a way that does not permit the easy separation of these causes. In such a case, the solution envisaged by clause 25 is that the architect, or in litigation the court, must apply judgment to determine the extent to which completion has been delayed by relevant events. In an appropriate case apportionment of the delay between relevant events and contractor's risk events may be appropriate. Precisely when and how that should take place is a question that turns on the precise facts of the case.

The time for issuing instructions

[23] A further legal issue is relevant to the present case: this relates to the time at which the architect is obliged to issue instructions in terms of clause 25.4.6. The relevant event specified in that clause is "the contractor not having received in due time necessary instructions". The expression "in due time" was said in ***Percy Bilton Ltd v Greater London Council***, *supra*, to mean "in a reasonable time": Lord Fraser of Tullybelton at [1981] 1 WLR 800-801. The meaning of the latter expression was discussed by Diplock J. in ***Neodox Ltd v Borough of Swinton and Pendlebury***, (1958) 5 BLR 38, at 42:

"What is a reasonable time does not depend solely upon the convenience and financial interests of the [contractors]. No doubt it is in their interest to have every detail cut and dried on the day the contract is signed, but the contract does not contemplate that. It contemplates further details and instructions being provided, and the engineer is to have a time to provide them which is reasonable having regard to the point of view of him and his staff and the point of view of the [employer], as well as the point of view of the contractors.

In determining what is a reasonable time as respects any particular details and instructions, factors which must obviously be born in mind are such matters as the order in which the engineer has determined the works shall be carried out..., whether requests for particular details or instructions have been made by the contractors, whether the instructions relate to a variation of the contract which the engineer is entitled to make from time to time during the execution of the contract, or whether they relate to part of the original works, and also the time, including any extension of time, within which the contractors are contractually bound to complete the works".

The first of the specific factors mentioned by Diplock J. is not strictly relevant to the present case, since under the parties' contract the architect is not given power to determine the order in which the works should be carried out. Instead, the contractor determines the programme. Nevertheless, the contractor's programme is clearly relevant in determining what is a reasonable time for giving any particular instruction. The other three factors are all relevant. In relation to the last, the time within which the contractor is contractually bound to complete the works, a difference arose between the parties. Counsel for the defender submitted that the contractual completion date, allowing for any extension, must always set a criterion against which the timing of instructions should be judged. Counsel for the pursuers, by contrast, submitted that, where the contractor's progress was such that he clearly would not complete by the contractual completion date, it was sufficient that the instructions were in sufficient time to meet his actual progress. In my opinion the current contractual completion date must normally be relevant, for two reasons. First, there is the possibility that the contractor will take special measures to accelerate progress. That is no doubt subject to an exception when the Completion Date is past, but in that event it may be that instructions should have been given prior to the Completion Date. The second reason is more general: the contractual provisions expressly envisage that information will be provided by the architect to the contractor to enable completion in accordance with the contractual Conditions (clause 5.4), and those conditions include the important obligation (clause 23) to proceed regularly and diligently with the works and to complete the works on or before the Completion Date. Nevertheless, all of the factors mentioned by Diplock J., subject to the qualification mentioned above in relation to the first, are potentially relevant in determining what is a reasonable time for the provision of information. Ultimately that question is a question of fact, and will depend upon the whole circumstances of the particular case.

Competing approaches of parties' expert witnesses

[24] I must now consider the factual issues that arise in this case. The defenders relied on expert evidence from their own programming expert, Mr Alan Whitaker, and on evidence from two witnesses of fact, Mr Kevin Cornish, who was the defenders' senior site manager for most of the duration of the contract, and Mr David Dibben, who at the time of the contract was the defenders' regional manager for South West England and South Wales. The pursuers relied solely on the evidence of their programming expert, Mr Nigel Lowe. They did not lead any witnesses of

fact. In relation to the witnesses of fact, I should state that I found both Mr Cornish and Mr Dibben to be credible and generally reliable witnesses. Mr Cornish, in particular, impressed me as having a good knowledge and understanding of what had happened as the contract works progressed. Before I examine the evidence in detail, however, I consider it appropriate to consider the different approaches taken by the parties' two expert witnesses. For the defenders, who led at the proof, evidence was given by Mr Alan Whitaker. Mr Whitaker was a Chartered Civil Engineer and a member of the Chartered Institute of Arbitrators. He graduated as a Bachelor of Technology in Civil Engineering; thereafter, from 1966 to 1988, he had worked for a number of major contractors as an engineer, site agent or contracts manager. The projects on which he worked were clearly very diverse; they are set out in Appendix A to his report No 7/156 of process. His experience extended to design and construction in industrial building projects. It is fair to say that his involvement was generally with large and intricate construction projects. In 1988 he established an independent practice, Alan E Whitaker & Associates, to provide computer-based planning services in the construction industry. This involved the provision of critical path analysis. As an independent consultant, Mr Whitaker was involved in a number of substantial projects. His practice continues in that area, but from 1993 onwards most of his work has been in the preparation, negotiation and settlement of claims, and acting as an expert witness in arbitration and litigation. He clearly had substantial experience in that area. Mr Whitaker produced a first report in the present case dated 30 October 2003 (No 7/156 of process) and a supplementary report dated 8 March 2004 (No 7/8 of process). For the pursuers, evidence was given by Mr Nigel Lowe. Mr Lowe is a construction contract consultant; he is a director of Nigel Lowe Consulting Ltd. He has qualifications in building and is a fellow of the Institute of Civil Engineering Surveyors, a member of the Royal Institute of Chartered Surveyors and a member of the Chartered Institute of Arbitrators. He worked in the construction industry from 1961, and was employed by a number of large building companies as a surveyor and project manager. He entered private practice in 1981, and since then has acted as a consultant in relation to construction contracts, dealing with the technical aspects of such contracts, including claims and delay analysis. He has extensive experience of building contract claims. Mr Lowe produced an initial report on the present case (No 6/15 of process), a further report dealing with Mr Whitaker's first report (No 6/16 of process), and a further report dealing with Mr Whitaker's second report (No 7/351 of process). Both Mr Whitaker and Mr Lowe were clearly well qualified to speak about the issues that arose in the case, and both gave their evidence in a clear and straightforward manner. In choosing between their evidence, I have been guided by the details of their evidence and what seems to me to be the inherent likelihood of their respective views against the known facts about the construction of the hotel. I should record that counsel on both sides criticized the impartiality of the witnesses on the other side, including the expert witnesses. I did not find any justification in these criticisms. I formed the clear view that all of the witnesses were doing their best to present their evidence in a fair and impartial manner, and on issues of fact I found them to be generally reliable.

Mr Whitaker

[25] As I have mentioned, Mr Whitaker produced two reports. His position changed in number of respects between the two reports. He explained that this had occurred because he had obtained a significant amount of further information during the intervening period. In particular, the pursuers had disclosed the diaries and weekly reports of the clerk of works. He had met Mr Nigel Lowe, the pursuers' expert, and had discussed the as-built programme with him. In addition, he had been given access to further documents in the possession of the defenders and had been provided with further information by the defenders and by Mr Kevin Cornish, who had been their senior site manager on the project. I think that the information provided by Mr Cornish is important; as indicated in the last paragraph, I considered him an impressive witness.

[26] Mr Whitaker described his approach as follows (No 7/8 of process, paragraphs 1.5-1.11). He first examined the programme against which the works were being constructed and tested it for reasonableness and completeness. He then examined the factual evidence to determine where time on the project was critically lost and identify the cause or causes of that loss of time. He concluded that three weeks had been lost during weeks 6, 7 and 8 of the contract; the cause of the loss in Mr Whitaker's opinion was additional work instructed in connection with the gas venting scheme (see paragraph [41] below). He was further of opinion that five weeks were lost between weeks 27 and 32 of the contract. He considered that the cause of this loss of time was a late instruction by the architect, RMJM, to vary the roof coverings from a built-up system to the Stramit Speedeck system. The lost time was in part concurrent with the effect of the loss of time caused by the gas venting works. The effect of the late instruction was that work on the roof steelwork began late; the design of the steelwork was dependent upon the roofing system that was used. In addition, the start of the roof coverings was similarly delayed by five weeks, because the late instruction had led to delay in the procurement of the roof coverings. Finally, Mr Whitaker thought that six weeks were lost between weeks 44 and 52 of the contract. This was caused by the lateness of a substantial number of architect's instructions varying the works following the dismissal of a RMJM and their replacement as architect by Keppie Architects. Mr Whitaker's overall view was that 11 weeks (6 weeks plus 5 weeks) were critically lost during construction. On that basis, he considered that a fair and reasonable measure of any extension of time to which the defenders might be entitled was 11 weeks.

[27] Mr Whitaker was critical of the as-built critical path analysis used by Mr Lowe; I deal with his specific criticisms that analysis at paragraphs [36]-[39] below. In evidence, Mr Whitaker stated that he had considered undertaking a critical path analysis, but decided not to do so. He did not have access to an electronic version of the defenders' original programme for the project, and because of this it was impossible to identify the defenders' original critical path through the programme. Nevertheless, making use of his experience in programming, Mr Whitaker had attempted to replicate what he surmised might be the logic of the defenders' original programme; he stated,

however, that he had no great confidence that his version of that programme was either correct or complete. Mr Whitaker stated that to continue with a critical path analysis based on logic that he knew not to be completely correct would have meant that he could not be sure of the evidence that he was giving to the court. Rather than following such a course, he adopted the method described in the last paragraph. In his initial report (No 7/156 of process, at paragraph 2.11) he stated that the task was to identify where critical time had been lost on the project, and that in order to do that it was necessary to understand the construction process involved in that project. In this way it was possible to identify "events in that construction process which logic, experience and common sense tell you will be critical to completion of the works". Mr Whitaker explained that he meant by that that delay to any of these critical points would mean delay to completion of the works as a whole unless exceptional measures were taken to recover lost time. Mr Whitaker identified events in the construction programme that he considered to be critical; these are discussed subsequently. Mr Cornish was asked about the various events that Mr Whitaker identified as critical and confirmed in relation to each that he also considered them to be critical for completion of the works.

[28] The pursuers criticized Mr Whitaker's approach to the case. They referred in particular to his failure to undertake a critical path analysis of the present project. That might be explained by the fact that Mr Whitaker preferred to use the as-planned v as-built method. Nevertheless, the weakness of that method was that, as Mr Whitaker acknowledged, it does not identify the critical path and therefore needs to be used with great care and understanding of the processes in the whole of the project. The pursuers submitted that an expert could only give a meaningful opinion as to which activities in a project are critical on the basis of an as-built critical path analysis, such as that carried out by Mr Lowe. For that reason it was suggested that I should treat with caution, and indeed scepticism, Mr Whitaker's opinion. The pursuers also pointed out that Mr Whitaker had significantly changed his opinion in relation to the delay arising from the gas venting scheme between his original report of October 2003 and his later report of March 2004 (No 7/8 of process). In justifying this, Mr Whitaker had relied on the fact that in preparing his initial report he had a limited amount of time and relied on Mr Lowe's as-built programme for his analysis; at that time he had not seen the Clerk of Works' diaries and weekly reports. The pursuers were nevertheless critical of Mr Whitaker on the basis that he provided a detailed opinion on the basis of inadequate information.

[29] In my opinion the pursuers clearly went too far in suggesting that an expert could only give a meaningful opinion on the basis of an as-built critical path analysis. For reasons discussed below (at paragraphs [36]-[37]) I am of opinion that such an approach has serious dangers of its own. I further conclude, as explained in those paragraphs, that Mr Lowe's own use of an as-built critical path analysis is flawed in a significant number of important respects. On that basis, I conclude that that approach to the issues in the present case is not helpful. The major difficulty, it seems to me, is that in the type of programme used to carry out a critical path analysis any significant error in the information that is fed into the programme is liable to invalidate the entire analysis. Moreover, for reasons explained by Mr Whitaker (paragraphs [36]-[37] below), I conclude that it is easy to make such errors. That seems to me to invalidate the use of an as-built critical path analysis to discover after the event where the critical path lay, at least in a case where full electronic records are not available from the contractor. That does not invalidate the use of a critical path analysis as a planning tool, but that is a different matter, because it is being used then for an entirely different purpose. Consequently I think it necessary to revert to the methods that were in use before computer software came to be used extensively in the programming of complex construction contracts. That is essentially what Mr Whitaker did in his evidence. Those older methods are still plainly valid, and if computer-based techniques cannot be used accurately there is no alternative to using older, non-computer-based techniques.

[30] In relation to the pursuers' other criticisms of Mr Whitaker, I do not draw an adverse inference from his change of position in relation to the effects of the gas venting instruction. His change of position was made clearly in his second report, and the reasons for it were stated in detail. His change of position was based on the receipt of further information. To change one's opinion in the light of further information seems to me to show openness of mind and a basic fairness of approach. Moreover, Mr Whitaker did indicate that his first report was produced under significant time constraints. Overall, I found Mr Whitaker's evidence to be generally cogent and persuasive, and for the most part I have adopted his analysis.

[31] The pursuers also criticized the defenders' overall position on programming. They pointed out that Mr Whitaker had only been provided with a hard copy of the defenders' original construction programme, not with a computer version. The programme had, however, been based on a computer programme known as Suretrack; this is a programme that is commonly used in the construction industry. Mr Whitaker had agreed that one reason for generating a construction programme using Suretrack software was to enable the revisal and updating of the construction programme as works proceeded. Mr Whitaker had also indicated concern that the defenders had not, during the contract works, updated their Suretrack programme, although he stated that that was not untypical. He acknowledged that critical part analysis used proactively is "a fantastic tool", in that it can demonstrate as works proceed whether there is any flaw in the logic of the programme. The use of a programme such as Suretrack permits the contractor to update his programme as construction progresses and to allow for the impact of events on the construction programme. Mr Lowe's evidence was that in his experience most contractors who use such software will continue to use it as the works proceed to monitor the progress of the works. In failing to do so, the defenders had hampered the presentation of the case and had also significantly hindered the experts in their analysis of the instructions and delays on the overall progress of the works. The absence of the programme also made it much more difficult to discover the contractor's original logic. In September 1999 the defenders produced delay charts using

Suretrack for the purposes of adjudication proceedings, which suggested that the programme had existed at that time.

[32] I accept that understanding what had happened during the progress of the works might have been a great deal easier if the defenders' original Suretrack programme had been available, and in particular if it had been updated as the works proceeded. Nevertheless, I am bound to approach the case on the basis of the evidence that is available. The programme was not available; in any event, even if it had been available, it is clear that it was not updated as the works proceeded, and for that reason I doubt whether it would have been of any real assistance. While the defenders' loss of the programme at a time when disputes had arisen between the parties might be regarded as culpable, I do not think that that it is the loss of the programme that has caused the difficulties; the fundamental problem is rather the failure to update the programme as works proceeded. The original programme is available in a hard copy, and a view of the logic of the programme can be obtained from that. In my view, on the basis of Mr Whitaker's evidence, failure to update the programme is relatively common, and it is easy to understand why that is so. In all the circumstances I do not think that I can draw any significant adverse inference from the fact that the defenders' records were less good than they might have been in other circumstances.

Mr Lowe

[33] Mr Lowe carried out a critical path analysis of the project, and on that basis produced a filtered as-built programme (No 7/161 of process). The critical path of a construction contract is a sequence of activities through the project from start to finish the sum of whose durations determines the overall duration of the project. Consequently any delay to the progress of an activity on the critical path may cause the duration of the overall project to be extended. Thus a critical path analysis depends upon a logical sequence of activities; each activity falling on the critical path can only be performed when a certain stage has been reached in a logically preceding activity. That stage varies; on occasion the succeeding activity may be in a position to start as soon as the preceding activity has started; in other cases it is necessary that the preceding activity should have finished before the succeeding activity can start; in yet other cases it will suffice if the preceding activity has been carried out in part to enable a start on the succeeding activity. If an activity is on the critical path to completion, any delay in starting the activity or any increase in the length or duration of the activity will produce a consequential effect on the date for completion. Mr Lowe carried out a critical path analysis of the project as built, rather than an analysis of the planned project. In an as-built analysis, it is known what the contractor actually did; for example, it may be known that the contractor in fact waited to complete one task before he started work on another, even though logically there was no reason for waiting. In such a case the resulting delay would be incorporated into an as-built programme. That affects the logic of the programme, and links must be inserted to show what was actually done, even though in theory a successor task could have started earlier.

[34] In evidence Mr Lowe stated that after producing his as-built programme he began his analysis by identifying, by inspection, whether any of the logic paths in the as-built situation were consistent with the planned situation as shown in the defenders' construction programme. He then looked at the records of the project to discover whether the defenders had departed from their planned logic. One example of this that he noted was the use of temporary sealing when construction reached the fourth and sixth floors respectively; this was designed to make the building temporarily weatherproof, to enable weather-dependent tasks to be carried out on lower floors. Thereafter Mr Lowe started from the date when completion was actually achieved and identified the last activity before completion. He then worked backwards towards the start of the project to determine the logic links in the programme as built, and then using those links he rescheduled the programme. This identified the critical path. It was accepted by the pursuers that an element of subjective judgment was required in this exercise; nevertheless, Mr Lowe indicated that in exercising that judgment he relied on his knowledge and experience of programming in the construction industry. Mr Lowe described the method that he used in handling the programme. Tasks were linked in three ways: first, logic lags could be used to maintain the correct time relationship between the tasks; secondly, it was possible to insert contractor or employer defaults to fill in the time gap between what was considered to be the reasonable logic and the time when an activity actually began; and thirdly, it was possible to use start flags to constrain a task to an actual start date. Mr Lowe also stated that it is necessary in a programme to take account of four types of restraints that may have an effect on progress. These are technological restraints (based on the method of construction), management restraints (based on decisions taken by the contractor), health and safety restraints and resources restraints (caused by lack of resources).

[35] Using this method, Mr Lowe expressed the opinion that none of the matters relied on by the defenders to support their claims for an extension of time had caused any delay. He came to that conclusion on the basis that none of those matters fell on the critical path through the project; that critical path was set out in his as-built programme (in No 7/61 of process). Mr Lowe's reasons for this conclusion are set out at length in his reports.

[36] Mr Whitaker criticized the method of delay analysis that Mr Lowe had adopted; in particular, he was critical of the use of an as-built critical path analysis. He stated that a critical path analysis involves identification of the duration of the relevant activities, based on the as-built records, and the logic links between those activities. The identification of the correct logic links was of vital importance. Problems arose with a critical path analysis when logic links were incorporated when they should not be there, or if logic links were inserted which were not wholly correct, or if necessary links were omitted. If a mistake was made in one logic link, that was liable to produce an error in the identification of the activities that were critical to completion of the works, and that in turn could invalidate the critical path shown in the relevant programme. If a number of erroneous links were identified, Mr Whitaker stated that it would definitely be the case that the critical path identified in the programme would not be correct.

[37] Mr Whitaker identified what he considered to the errors in the logic links inserted by Mr Lowe in his as-built programme (number 7/161 of process). He further suggested that Mr Lowe had omitted certain important links from his programme. The errors referred to by Mr Whitaker were as follows:

(i) Line 8: AB Construct ground floor slab. The bar representing this activity was not split to reflect that the ground floor slab was poured in two pours. In cross-examination, Mr Lowe accepted that this would require the start of the activity to be linked to an earlier activity; otherwise activities that were critical would become non-critical on rescheduling, and the critical path might be altered.

(ii) Line 12: AB construct 2nd floor to 3rd floor. This activity was not shown as critical on Mr Lowe's programme, but in cross-examination he accepted that it should have been shown as critical. Mr Lowe further accepted that the link shown coming in to the activity from line 10 was erroneous, as it omitted a floor of the building. Finally, Mr Lowe accepted that a link was missing from his programme; he stated that there should be a start-start (SS) link from line 11 to line 12.

(iii) Line 13: AB construct 3rd floor to 4th floor. Mr Lowe accepted in cross-examination that the link from line 11 to line 13 (13FS2d, signifying a finish-start link with a time lag of two days) was erroneous; once again a floor was omitted. Mr Lowe further accepted that it was wrong to indicate that the start of the activity at line 13 depended upon the finish of the activity at line 11; instead, the link should have been a SS link from line 12 to line 13.

(iv) Line 14: AB construct 4th floor to 5th floor. This activity is shown as non-critical in Mr Lowe's programme, but in cross-examination he accepted that this was wrong and that the activity should be shown as critical. Mr Lowe further accepted that the link to the start of line 14 from the end of line 12 (14FS6d) was incorrect; instead the programme should have shown a SS link from line 13 to line 14.

(v) Line 15: AB construct 5th floor to 6th floor. Mr Lowe accepted in cross-examination that the link to the start of line 15 from the end of line 13 (15FS1d) was incorrect, and it was also incorrect to state, as the programme indicated, that the criticality of the activity at line 15 depended on the activity at line 13. The link should rather have been a SS link from line 14 to line 15.

(vi) Line 15: AB construct 5th floor to 6th floor. A central feature of Mr Lowe's evidence was the view that neither the roof steelwork nor the roof cladding was on the critical path. The first link out of line 15 was to the reinforced concrete stair flights at line 38 (38FF1d), that link being shown as critical. Work on the reinforced concrete stair flights is shown as finishing on 19 August 1998, at the level from the 4th to the 5th floor; that accords with the Clerk of Works' diary (No 6/18 of process). At line 38 of Mr Lowe's programme the first link onwards is 52FS-3d (finish to start less three days); the activity at line 52 is stud partitioning and dry linings. That link is critical, as both of the activities at lines 38 and 52 are critical. The stud partitioning and dry lining work is recorded as having started on 17 August 1998 in Mr Lowe's programme and in the parties' joint minute. This work started at 1st floor level according to the Clerk of Works' diary. In cross-examination Mr Lowe accepted that there was no technical or construction relationship between the work on the stair flights at the 4th to 5th floor level and the start of the stud partitioning and dry lining work at 1st floor level. On that basis, the critical link between lines 38 and 52 does not appear justified. In any event, it is difficult to see why there should be any such relationship, as a matter of common sense. Mr Whitaker's evidence was to that effect, as was that of Mr Cornish.

(vii) Line 49: AB load out plant room equipment. The plant room was situated at roof level, under the cladding. The last part of this activity was the hoisting in of the chillers, which took place on 30 November 1998. The last successor link from line 49 identified in Mr Lowe's programme is 20FS19d, which is shown as a critical link. Line 20 relates to as-built roof cladding. The link from line 49 leads to a section of line 20, shown as critical, marked "Steel trim". The logic of the programme accordingly indicated that the contractor required to wait 19 days from the chillers' being hoisted into the plant room before the steel trimming work could be done. The steel trimming work identified at line 20 in fact took place on 11 January 1999; that work was to the smoke vents (Clerk of Works' diary, No 6/19 of process, 11 January 1999). The smoke vents are situated at each end of the building, whereas the chiller compound is in the middle. When he was cross-examined, Mr Lowe accepted that there was no "reasonably practical relationship" between the hoisting in of the chillers and the steel trimming work on the smoke vents. That link accordingly appears to be erroneous. Mr Lowe accepted that, if that link were to be deleted and the programme rescheduled, items which were shown as critical would become non-critical (day 25, 10.29). That of itself appears to cast considerable doubt on the accuracy of Mr Lowe's programme.

(viii) Line 20: AB roof cladding. In Mr Lowe's programme this work is shown in a number of sections, the last of which refers to "penetrations". The final successor link from this line is to snagging, shown as 60FS0d. This link is shown as critical. On the programme that critical link is shown to snagging taking place on or about 22 February 1999. According to the Clerk of Works' diary, snagging at that time was to the bedrooms; Mr Lowe accepted that snagging in the bedrooms had been going on for some time before that (day 24, 3.18). On this basis there does not appear to be a relationship between the end of the work on roof penetrations and the snagging going on at that time. Mr Lowe stated that the completion of the roof level penetrations was coincidental with the time at which a sample room had achieved a satisfactory state, and referred to pipe work through the building and the testing of the soil stacks to justify a link. He accepted, however, that work to the soil stacks would only have affected snagging if the stacks had failed their test, which they did not. Consequently the logic link does not appear to be based in fact. Moreover, in Mr Lowe's programme there is no logic link from the soil stacks at line 43 to snagging at line 60. It seems, therefore, that this link was not justified. In his evidence Mr Whitaker denied that there was any such link.

(ix) Line 50: AB plant room installation. A link joins line 50 to soil stacks at line 43, the link being 50FS-1d. When cross-examined, Mr Lowe accepted that it was probably not the case that the contractor could only start installing plant in the plant room one day before the completion of the soil stacks. If that is so, the link would be incorrect.

(x) Line 20: AB roof cladding. The only link shown from this activity to any mechanical and electrical activity is to soil stacks at line 43 (identified as 43FS9d). Mr Lowe considered that link to be critical, but he thought that the only mechanical and electrical activity that depended on the roof cladding was the testing of the soil stacks. Mr Lowe further stated (day 24, 3.45) that there was no practical relationship between the roof cladding and the second fix mechanical and electrical work. He justified that position on the basis that the defenders had installed temporary covers at 4th and 6th floor level over the 18 voids created by the risers that run up through the building. He conceded, however, that once the plant and equipment were in place at the plant room level a roof would be necessary in order to take the covers off the plant and equipment and to allow connections to be made down through the building (day 25, 10.11). That would require the temporary covers to be removed. On this basis, it seems that the roof must be critical, at least once the plant was put in place and the contractor wished to connect it to the services running through the building. This is a point of some importance, and I return to it at paragraph [38].

(xi) Line 17: skim plaster finish to bedroom walls and ceilings. The only successor link is to line 57, decoration, and is shown as 57FS1d. Both of these activities are shown as critical in Mr Lowe's programme, and Mr Lowe accepted that the logic link between them is critical. In cross-examination, however, he conceded that this critical link was wrong (day 25, 10.36). He accepted that the link should have been start to start rather than finish to start; it is obvious why this is so, since decoration could clearly begin as soon as the earlier parts of the skim plaster had dried. Mr Lowe was then asked what would happen if the erroneous link were deleted, the correct link inserted and the programme rescheduled; he believed that the skim plaster activity at line 17 became non-critical. Mr Whitaker specifically disagreed with Mr Lowe's programme at this point, as did Mr Cornish.

(xii) Line 54: ceramic tiling. Mr Lowe records the finish date for this activity as being 11 December 1998. One of the successor links is to snagging, at line 60; this is stated as 60FS-5d. Mr Lowe stated that he had inserted this link because there was nothing following ceramic tiling that needed to be done apart from snagging. In cross-examination it was suggested to Mr Lowe that this was incorrect because it did not take account of work that required to be done in relation to the en suite fittings. Mr Lowe stated that the work on the en suite fittings was part of second fix joinery in his programme, at line 56. Nevertheless, Mr Lowe showed second fix joinery finishing on 4 March 1999, but according to the Clerk of Works' diary work on the en suite fittings continued until 10 March 1999. That suggests that the programme is not correct. Furthermore, in cross-examination Mr Lowe accepted that there was a relationship between the ceramic tiling work and the work on the en suite fittings, as those fittings were attached to the ceramic tiling, with the result that the tiling had to be in place first. Mr Lowe did not, however, show any logic link between the ceramic tiling, shown as a critical activity, and second fix joinery, where the en suite fitting work was reflected. That appears to be a significant link that is missing from the programme. I should add that both Mr Whitaker and Mr Cornish rejected the link shown between line 54 and line 60 in Mr Lowe's programme.

(xiii) Line 52: AB stud partitions and dry linings. Mr Lowe's programme does not show any link from this activity to any mechanical and electrical activity. He stated in evidence, however, that in the area between the bedrooms and the bathrooms the stud partition walls would be erected with the second fix electrical and plumbing work within them; metal studs and one side of the plasterboard would be erected, followed by the electrical and plumbing work, followed by the second side of plasterboard. On this basis Mr Lowe accepted (day 26, 10.22) that there was a relationship between the stud partitions and second fix wiring, shown at line 44. No such link is reflected in Mr Lowe's programme, although stud partitions and dry linings are shown as a critical activity.

(xiv) Line 30: install temporary windows -- timber frame and polythene. In this case a link is shown to first fix joinery, at line 53, in the form 53SS9D; that indicates that first fix joinery cannot start until nine days after the start of the installation of temporary windows and polythene sheets. That link is between two critical activities, and should therefore be regarded as critical. Mr Cornish, however, considered that little work was involved in first fix joinery, and that such work as there was not dependent upon the temporary windows; thus there was no relationship between the two. Mr Whitaker supported this view; first fix joinery referred to work in the bathroom area, but this was not near the outer walls of the building and was therefore not dependent upon the temporary windows. On this basis it appears that the link shown by Mr Lowe is erroneous. Mr Lowe further showed a link between temporary windows at line 30 and ceramic tiling at line 54, in the form 54SS12d. Both of these activities are shown as critical. Mr Whitaker stated that, before any tiling could be done, the contractor required first to erect the stud partition walls on which the tiling was placed. If there were any link with the temporary windows, accordingly, it would be expected that this would run through the stud partitioning. No such link was shown, however, and in fact the stud partitioning work started on 17 August 1998, prior to the start of the installation of the temporary windows on 8 September 1998.

(xv) *Line 19: grout in steelwork. A successor link is shown to roof cladding, at line 20, in the form 20FS-10d. When asked about this link, Mr Whitaker stated that the logic link was erroneous because the roof cladding work was not dependent upon the grouting of the steelwork, and the work in fact started one week before the grouting of the steelwork. On Mr Lowe's programme roof cladding is shown starting on 14 September 1998, one week before the start* of grouting to the steelwork.

[38] It accordingly appears that a number of errors exist in Mr Lowe's programme; these were largely accepted by him. In my opinion that inevitably makes his as-built critical path analysis of very doubtful value. It is in my opinion clear

that such a programme is critically dependent upon the logic links between different activities; that was accepted by both experts. If that is so, I am of opinion that Mr Whitaker must be correct when he states that an error in one logic link can vitiate the whole programme, and errors in a number of links will almost inevitably vitiate the programme. In this connection, certain particular parts of Mr Lowe's evidence call for comment. First, in re-examination (day 13, 2.32) Mr Lowe was asked about the link between line 17 and line 57 (paragraph (xi) above). In cross-examination he had accepted that the link should have been start-start rather than finish-start, and accepted that that could render line 17 non-critical. In re-examination Mr Lowe was asked whether this would alter the critical path from line 57 (decoration) onwards, and he replied that he could not say that with certainty. He went on to say, however, that this would not affect the non-criticality of the roof covering. Nevertheless, the important point is that Mr Lowe did not know where the critical path lay following the decoration works. It is agreed in the parties' joint minute that the decoration works were completed on 23 February 1999. Secondly, although Mr Lowe was adamant that the roof covering was not critical, he did ultimately accept that once plant and equipment were in place at plant room level the roof would be necessary in order to take the covers off the plant and equipment to allow it to be connected to the services running through the building (see paragraph (x) above). That does suggest some degree of criticality, at least, and this concession is consistent with Mr Whitaker's evidence. The concession is also supported by photographs of the roof during construction, which were put to Mr Lowe during cross-examination; these showed considerable amounts of standing water on the roof. Thirdly, in relation to the link between line 17 and line 57, the pursuers submitted that what Mr Lowe's analysis showed was what actually happened on site, rather than what might have happened; the delay merely showed that the decorators waited for two weeks between the two tasks. Mr Lowe, however, accepted in cross-examination that the link in question was erroneous and that, if it was replaced by the correct link and the programme was re-scheduled, the skim plastering activity at line 17 would become non-critical (day 26, 10.12). That seems to me to illustrate a clearly that it is quite impossible to surmise what the programme might show if the correct logic links were inserted; the existence of a substantial number of incorrect links simply vitiates the programme.

[39] Counsel for the pursuers submitted that Mr Lowe's evidence was not dependent upon the use of the as-built critical path analysis. He had analyzed the various delaying events and their effect on the works in the context of the progress that the works had achieved on site at the relevant time. The as-built critical path analysis had been used as a separate tool to analyze the project. Counsel submitted that the most that could be taken from the defenders' criticism of the critical path analysis is that it could not be relied upon from 23 February 1999 onwards; that date marked the completion of the decoration works (line 57). That would not affect Mr Lowe's analysis of either the gas venting works or the roof cladding. In addition, counsel submitted that, in relation to the works instructed following the appointment of Keppie in place of RMJM, Mr Lowe's analysis of each item was carried out in the context of the overall progress of the works on site at the relevant time, and therefore was not subject to any overall criticism of his critical path analysis. In my opinion there is some force in the last of these points; in relation to the works instructed following the appointment of Keppie Mr Lowe's analysis did appear to proceed in part on matters other than the formal critical path analysis found in No 7/161 of process. Consequently, in relation to these works I will consider the evidence of Mr Lowe in relation to each specific item. I will follow the same course in relation to the gas venting works and the roof cladding, to the extent that Mr Lowe's evidence was not dependent upon his formal critical path analysis. I do not accept, however, that the criticism of the critical path analysis is confined to the period after 23 February 1999; in my opinion the criticism goes further, and extends to earlier periods.

Conclusion

[40] For the foregoing reasons I generally prefer the approach taken by Mr Whitaker. His views, as contained in his second report (No 7/8 of process), appeared to me to the based on the factual evidence. Moreover, his method of proceeding appeared to be based on sound practical experience and on common sense; I also found the logical connections that he drew in discussing programming to be entirely intelligible. So far as Mr Lowe is concerned, I do not think that it is possible to base any reliable conclusions upon his formal critical path analysis, for the reasons discussed above. Other parts of his evidence were of assistance, however, particularly in relation to concurrent causes of delay; I generally accept his evidence on the delaying effect of the lifts and the stair balustrading. I will now turn to the areas in which, according to the defenders, critical delay was caused by instructions issued on of the pursuers. These were the gas venting system, the roof still work and the series of instructions issued following the replacement of RMJM by Keppie.

Gas venting

[41] In the original specification of the contract works a gas proof membrane was to be inserted at foundation level to prevent the emission of radon gas from the soil under the building. The form of membrane originally specified was a product known as Bituthene. On 23 March 1998 RMJM issued an architect's instruction to use an alternative form of membrane known as Proofex. In his first report Mr Whitaker stated that he considered that a delay of approximately 3 1/2 weeks had occurred in starting work on the superstructure owing to the fact that that Architect's instruction was issued late. In his second report, however, Mr Whitaker changed his opinion, and expressed the view that the cause of the delay was not the late issuance of the instruction but the work content involved. This has consequences for the application of clause 13.8 of the contract conditions: see paragraph [140] below.

[42] It was a matter of agreement between the experts that delays had occurred in the construction of the substructure of the building. The experts were, however, in dispute as to responsibility for that delay. The crucial issue related to the delay in constructing the ground floor slab. Mr Whitaker took the view that this activity was critical (first report, paragraph 2.12), because the reinforced concrete frame of the building was constructed on that slab and was

accordingly dependent upon it. Mr Cornish's evidence was to similar effect. I have no difficulty in accepting that evidence. In his second report Mr Whitaker expressed the opinion (paragraphs 2.6-2.10) that the delay had been caused by additional work involved in the alternative gas venting scheme. The ground floor slab, made of concrete, was reinforced by concrete beams. In the tender scheme a straightforward membrane was laid on top of the hardcore which supported the ground beams and ground floor slab; the membrane was continuous, and passed under both beams and slab. In that situation, in Mr Whitaker's opinion, it is common practice to pour the ground beams homogeneously with the ground floor slab. That obviously involves a single pour. The as-built records, however, disclosed that part of the ground beams was constructed first, before the floor slab was constructed above them. Mr Whitaker was of opinion that that resulted from the revised scheme. In the revised scheme using the Proofex membrane, it was necessary to construct polythene pipes through the ground beams to allow gas to pass out of the building. Those pipes involved a more complex form of construction. The membrane required to be cut to allow each pipe to pass through it, and a product known as Cordex Ventform was used around the pipes; the arrangement is shown in drawing 1056(28)006D (No 6/138 of process). Mr Whitaker described the work involved as "intricate". He stated that that work, including the separate construction of the ground floor beams to allow the pipes to pass through them and through the membrane, would have the effect of delaying the pouring of the ground floor slab and would thus delay the start of the superstructure works. At paragraph 2.6 of his second report Mr Whitaker produced a chart showing the planned and as-built programmes for the substructure works and the first part of the superstructure works, namely the construction of columns and walls to the first floor. This showed delay to commencement of the columns and walls to first floor of 3 1/2 weeks. The actual duration of that work was three weeks and two days, compared with five weeks planned; consequently the delay to the completion of the activity was only two weeks and one day. Mr Whitaker expressed the opinion that the most likely cause of the delay of 3 1/2 weeks to the start of superstructure works was the additional work instructed in connection with the gas venting scheme.

[43] In evidence Mr Whitaker stated that the introduction of the gas venting scheme had the direct effect of delaying the pouring of the first half of the ground floor slab (day 10, 2.35). Mr Lowe expressed the view that the ground beams and ground floor slab could have been poured together despite the gas venting scheme; Mr Whitaker stated that such a course would have risked damaging the gas membrane. Mr Whitaker's reason was that the venting pipes would have been relatively unsupported when the concrete was poured, and the connections at the ends of the pipes were delicate and would easily be damaged. If those connections had been disturbed, gas could permeate through the barrier that the membrane was designed to create and enter the building; that would destroy the basic purpose of the gas venting scheme. In cross-examination (day 15, 12.55) it was suggested to Mr Whitaker that the delay was actually caused by extra work required in the lift pit area in the middle of the building; on that basis the defenders should have poured the ground floor slab in three porous rather than two. Mr Whitaker rejected this suggestion; he thought that the fact that the pour was not done in three sections was a further indication that the cause of the delay was the work on the gas venting scheme. In response to questioning by the court (day 19, 12.15) Mr Whitaker stated that the extra work required in the area of the lift pit was completed at about the same time as the additional work required through the introduction of the gas venting scheme; thus pouring the slab in three pours would not have assisted.

[44] Mr Lowe (day 24, 12.07) described the work involved in installing the membranes and pipes. The defenders required to cut a hole through the membrane, slide the pipe through the hole, slide the first part of the membrane collar on to the pipe and attach it, slide on the second part of the collar and attach it, insert the Ventform barrier material around the pipe, fill any voids with mortar, and wrap the membrane over the Ventform. In my opinion that is plainly a relatively elaborate procedure, and it is one that would not have been required if construction had proceeded according to the tender drawings. Mr Dibben stated (day 9, 10.40) that the requirement of gas venting introduced new work into the contract on the critical path. The construction of the building was complex on the ground, and the structural elements were interrelated. Thus the additional work immediately stopped operations that were occurring; the defenders had to put the venting in before going on. That was summed up in a letter to the architect dated 31 March 1998 (No 7/130 of process). Mr Dibben further stated that the gas venting scheme delayed the ground floor slab, which had a knock on effect on the critical path. The letter of 31 March 1998 intimated that, in accordance with clause 25 of the contract conditions, the progress of the work was likely to be delayed because of the gas venting works. It was indicated that the relevant drawing introduced additional works to those in the tender documentation. This necessitated a new sequence of construction relating to the substructure works. That sequence was indicated in detail; the new operations involved were the construction of formwork to the ground beams and vent pipes prior to the concreting of the ground beams, the striking of the formwork, the placing of the Cordex Ventform and sealing the pipes, and the laying of the Proofex membrane and protection board. Certain other activities also had to be resequenced. The letter indicated that, in the defenders' opinion, the matters described would delay completion of the works by three weeks beyond the Completion Date.

[45] RMJM wrote to the defenders by letter dated 9 October 1998 (No 6/36 of process). In that letter they stated as follows:

"Based upon the information provided by you in your letters of 25 August 1998 and 31 March 1998, the Architect's Instruction issued to you and our projects records, we estimate the effect on the Contract Completion Date to be as follows:

1. *Compliance with Architect's Instruction No. 1 of 27 January 1998 discharging the provisional sum for gas venting works is a Relevant Event of the type described in clause 25.4.5.1.*

2. *The Relevant Event caused delay to the works for a period of 2 weeks in the timing of the achievement of the critical first floor slab consequent upon the revised erection sequence of the lower structure".*

The letter continued by stating that RMJM had been advised that, by direct agreement with the pursuers, the defenders had undertaken to absorb this delay; the result was that the architect decided that no extension of time should be granted. I should state that no evidence was led before the court to suggest that any agreement to absorb such delay had been concluded. The pursuers aver that such an undertaking had been given by Mr Dibben at a meeting held on 8 April 1998. The only witness who gave evidence on the matter was Mr Dibben (day 9, 10.50-11.35). His evidence about the meeting was as follows. He had stated that the gas venting membrane was additional work and central to the critical path. He had further said that the pursuers had nevertheless taken some accelerated measures. The pursuers' Mr Sandy Orr had stated, however, that he was not prepared to accept that at that stage of the contract the defenders could be incurring a potential delay. Mr Orr said that he did not see this as the action of a partnering or team contractor; he had said something like *"You're not getting an extension of time out of me"*. Mr Dibben was clear that he did not agree to undertake to absorb any of the delay. No such undertaking had been recorded in the minutes of the meeting. Mr Dibben was referred to the letter of 9 October 1998 and stated that he had been "flabbergasted" at the suggestion of an undertaking to absorb delay. On this matter I found Mr Dibben's evidence to be both credible and reliable, and I accept it. Moreover, it seems to me that if any such undertaking had been given it was a serious matter, and I would certainly have expected to find it recorded in the minutes of the meeting. It was not so recorded, however. On this basis I conclude that no such undertaking was given. Subject to that, RMJM clearly considered that the defenders had been delayed by the instruction relating to the gas venting scheme. Furthermore, they did not criticize the defenders' decision to alter their intended sequence of construction.

[46] Mr Lowe expressed the opinion that the delay in starting the superstructure was caused by the defenders' decision to revise their original construction sequence (day 24, 12.29). He was not clear why the revised sequence had been adopted. His position seems inconsistent with that of RMJM, who were the contract architect at the relevant time. On this matter, I am of opinion that, if any substantial criticism of the defenders' decision were possible, it would in all probability have been taken up by RMJM. The fact that it was not indicates that the decision is likely to have been reasonable.

[47] Mr Lowe further gave evidence that the delay in the construction of the ground floor slab resulted from problems that were encountered with out of position piles. This necessitated the redesign of the pile caps at gridlines A3, A4, A12 and D3. The ground floor slab was in fact poured in two halves, and three of the piles in question, A3, A4 and D3, were in the area of the second pour. Consequently it is unlikely that they delayed the first pour. It was the first pour that was critical, however, because that permitted a start to be made on the works above the ground floor slab. So far as A12 was concerned, the problem was resolved on 9 April 1998; that appears from the Clerk of Works diary (No 6/18 of process). The first half of the ground floor slab was poured on 21 April 1998. In these circumstances I am of opinion that the problems with out of position piles did not delay the pouring of the ground floor slab; the only pile that affected the first pour had been dealt with 12 days previously.

[48] In these circumstances I conclude that the only explanation for the delay that has been advanced is the change in the construction activities necessitated by the gas venting scheme. No other tenable alternative has in my opinion been put forward. My conclusion is supported by the defenders' contemporary claim and by the reaction of RMJM to that claim. There was also evidence in the Clerk of Works' diary, in the period from 16 March 1998 onwards, that considerable work was involved in the construction of the ground beams. This is entirely consistent with the conclusion that I have reached. I am further of opinion that the instruction of the gas venting scheme was a Relevant Event for the purposes of clause 25.4.5.1. Clause 13.8 of the contract applies to such an instruction; I consider its application below at paragraphs [140] onwards.

[49] The next issue that must be considered is causation: whether the instruction relating to the gas venting scheme caused completion of the Works to the delayed beyond the Completion Date. In my opinion it is clear that completion of the ground floor slab was a critical activity, as it formed the base on which the whole superstructure was constructed. That was the view of both Mr Cornish (day 2, 11.35) and Mr Whitaker (second report, paragraph 2.11); Mr Whitaker stated that a delay in the ground floor slab would inevitably delay completion of the Works as a whole unless exceptional measures were taken to recover lost time. That seems obvious; as Mr Whitaker explained in his report (at paragraphs 2.9 and 2.10), the delay in the ground floor slab delayed the construction of columns and walls to the first floor, which in turn delayed the first floor slab, which in turn delayed columns and walls to the second floor, and so on. Mr Whitaker's opinion was that the length of the delay was 3 1/2 weeks (second report, paragraph 2.10). That is relatively close to the figure put forward in the defenders' letter to RMJM of 31 March 1998 (No 7/130 of process, paragraph 3.0). In RMJM's letter of 9 October 1998 (No 6/36 of process) the view was expressed that the gas venting instruction had caused a two-week delay. That letter was put to Mr Lowe, who seemed to agree with it (day 24, 12.42).

[50] In his second report, Mr Whitaker expressed the view (at paragraphs 2.11-2.16, under reference to the table at Page 7/8/10) that the defenders recovered some of the time lost through the gas venting instruction; he thought that by 17 June 1998 the defenders were between 1 1/2 and 2 weeks behind programme, and were recovering lost time. Mr Lowe accepted that the defenders had recovered some lost time. Both experts agreed that at the finish of the fifth floor slab one week of the initial delay of three weeks four days had been recovered, reducing the delay to two weeks four days. Both experts also agreed that the sixth floor slab finished four weeks late. Mr Cornish (day

2, 12.04 onwards) stated that the defenders had worked longer hours and at weekends to make up lost time as the superstructure proceeded; they had also used additional resources. At that time the defenders were intent on making up the time that had been lost. That had been expensive, however, and there was no point in continuing to take exceptional measures if that became a pointless exercise. Eventually it became apparent that the project would be delayed by the problems with the roof steelwork, which lay on the critical path. At that stage it no longer seemed necessary to go to extraordinary lengths to recover the situation, since that would have no effect on the critical path of the project (day 3, 11.11). At that point the defenders had stopped Sunday working and the working of longer hours, because of the cost. Once the project had been delayed by the roof steelwork, any such expenditure would be a pointless exercise. That evidence is supported by the summary that Mr Cornish made as project manager for the site meeting held on 15 July 1998 (No 7/35 of process, at page 33). Mr Whitaker generally agreed with this analysis (day 13, 2.09). The evidence from Mr Cornish on this point was not contradicted, and is supported by his contemporary record. I accept it.

[51] I have found the evidence of Mr Whitaker to be persuasive generally. His opinion was that the instruction of the gas venting scheme caused delay to completion of the Works by 3 1/2 weeks. I am of opinion that that is supported by the evidence summarized above; I accordingly conclude that the gas venting scheme caused delay to completion by a period of 3 1/2 weeks.

Roof steelwork and cladding

[52] When the defenders were invited to tender for the project the roof cladding specification was based on a system known as Stramit Speedeck. This appears from section H31 of the Bills of Quantities (No 6/28 of process). The Stramit system was an aluminium profiled cladding system. Section H31 began as follows:

"To be read with Preliminaries/General conditions.

The Contractor is invited to offer alternative proposals for this specification. Any alternative must achieve the technical and visual performance inherent in this specification and relating drawings.

In any event the Contractor or specialist will be required to assume full responsibility for the design, construction and warranty of the roof enclosure".

The reference in that provision to alternative proposals is an invitation to the contractor to provide Value Engineering ("VE") proposals in relation to specified parts of the Works. The intention was that the contractor should put forward alternative systems of construction which would produce cost savings; these would obviously be reflected in the Contract Sum. In the course of the tendering process the defenders put forward a list of such proposals (No 7/17 of process); these included the system of roof covering, where a proposal was made to use a built up roof covering system rather than the proprietary Stramit system. The proposal relating to the roof covering system was VE Proposal 13; it provided: "Change specification of roof cladding to built-up system". A saving of £5,000 was placed against this item. In total 32 VE proposals were made, which might result in a total saving of £128,000.

Contractual status of VE Proposal 13

[53] The first issue that arises between the parties in relation to the roof steelwork and cladding is the contractual status of VE Proposal 13. The defenders contend that that proposal formed part of the contract. Consequently, when on 29 June 1998 RMJM instructed the defenders to use the Stramit system, the defenders submit that that amounted to a variation, and indeed a late instruction; that was a Relevant Event for the purposes of clause 25, and would entitle the defenders to an extension of time. The pursuers, by contrast, contend that VE Proposal 13 did not form part of the contract. The defenders' obligation under the contract was to use the Stramit Speedeck system. Consequently the instruction of 29 June 1998 did no more than confirm the contractual position, and did not amount to either a variation or a late instruction.

[54] Certain clauses of the parties' contract are relevant to this issue. The most significant of these is clause 14, headed "Contract Sum". This clause forms part of the Schedule of Amendments specially prepared for the purposes of the parties' contract; it replaces clauses 14.1 and 14.2 of the JCT Standard Form. Its purpose is, broadly speaking, to replace the usual JCT clause with a provision specifying a guaranteed maximum sum and taking account of Value Engineering savings. Clause 14.1 provides as follows:

"The Employer shall pay to the Contractor in consideration of the carrying out and completion of the Works the guaranteed maximum price comprising, the Contract Sum or such other sum as shall become payable hereunder at the time and in the manner specified in the Conditions".

Clause 14.2 indicates the significance of the guaranteed maximum price:

"Notwithstanding anything contained in the Contract whether express or implied and/or any claim at law the Employer's entire aggregate liability for any payment to the Contractor of any sum of whatsoever in nature and howsoever arising for the carrying out and completion of the Works shall be limited to and in no circumstances exceed the guaranteed maximum price comprised in the Contract Sum save only where the Conditions expressly provide for any increase in the Contract Sum".

Clause 14.3 then provides:

"The quantity and quality of work included in the Contract Sum shall be deemed to be that which is required to be carried out and completed in compliance with the Contract Documents".

That indicates a clear relationship between the work that is to be carried out under the Contract and the Contract Sum; I consider this relationship to be important for reasons that are discussed further below. Clause 14.5 provides for adjustment of the Guaranteed Maximum Price Contract Sum in respect of three matters: provisional sums;

contingencies and day work; and unforeseen or unknown ground conditions. No mention is made there of Value Engineering savings. Clause 14.6 indicates the amount of the guaranteed maximum price:

"The Guaranteed Maximum Price Contract Sum is £4,959,578 comprising all adjustments made for Value Engineering savings and the like and is as set out in Appendix E hereto".

Clause 14.7 deals with VE savings; it provides:

"The Value Engineering savings which form part of the Contract Sum are defined and set out in Appendix F hereto".

Finally, clause 14.8 provides that any Value Engineering savings other than those stipulated in clause 14.7 are to be shared between the parties in an agreed manner.

[55] VE proposal 13 is specified in Appendix F as follows:

"Omit stramit roofing as described in specification Clause H31:140 and substitute with a built up roof cladding system as follows: --

- *Topsheet in plastisol coated steel outer sheet.*
- *Breather membrane.*
- *Fibre glass quilt insulation 100 mm thick.*
- *White enamel faced under liner sheet with taped joints fixed with spacers to purlins.*

Roof pitch will need to be a minimum of 6°".

The saving brought out in respect of the proposal is £5,000.

[56] Appendix E sets out the calculation of the Guaranteed Maximum Price Contract Sum. The calculation proceeds as follows. It starts with the original tender sum of £4,919,912. To that is added a Guaranteed Maximum Price "premium" of £76,000. Three deductions are then made: current VE savings amounting to £128,000; a saving of £100,000 if a Glasgow contract were awarded to the defenders; and items not now to be included in the contract, amounting to £13,334. Two additions are then made for undefined provisional sums in respect of "Section 106 Works" and the gas membrane; these additions total £105,000. Finally the saving of £100,000 in respect of the Glasgow contract is added back, but is to be deducted following the agreed negotiation of the Glasgow contract price. The result of the calculation is a proposed Contract Sum of £4,959,578.

[57] It is in my opinion clear from the foregoing provisions of the Contract that the Contract Sum is calculated on the basis that the VE proposals set out in Appendix E form part of the Works. That is clear from clause 14.6, where it is expressly stated that the Contract Sum includes all adjustments made for VE savings as set out in Appendix E, and from Appendix E itself, where the calculation shows the deduction made for VE savings. At this point it is important to bear in mind the nature of the present contract; it involves the provision of goods and services in consideration for a price, and generally speaking the work that is to be provided under the contract will be reflected in that price. This is a matter of great importance to the parties, because these matters will determine the economic benefits that they obtain from the contract. It is, moreover, a factor that is directly reflected in the terms of clause 14.3. It follows that if an item of work is included in the Contract Sum it will normally form part of the contractual Works. In the present case, therefore, I am of opinion that the Works included the built up system of roof covering indicated in VE Proposal 13. This conclusion is supported by a practical consideration: if the VE proposals were not included in the Works, the Contract Sum would have to be recalculated to reflect the defenders' obligations as contractor. That would introduce an unnecessary complexity; if the Works did not include the VE proposals, it would plainly make sense to calculate the Contract Sum on that basis.

[58] Three other provisions of the contract support the conclusion that the VE proposals form part of the Works. First, if the Works did not include the VE proposals, it is difficult to see the point of clauses 14.6 and 14.7, both of which refer expressly to VE savings; clause 14 as a whole could have assumed a simpler form, as could the calculations in Appendix.E. Secondly, clause 14.5 provides expressly for certain forms of adjustment. If the VE proposals contained in Appendix E did not form part of the Works, it would be expected that they would be referred to in that clause, either as provisional sums or in an analogous manner. That was not done, however. Thirdly, clause 14.8 makes express provision for VE savings other than those contained in Appendix E. That indicates that a clear distinction is drawn in the contract between the Appendix E savings and other possible savings, with the former being included in the Contract Sum and Works and the latter being the subject of further adjustment.

[59] For the pursuers it was contended that the contract specification provided for the use of the Stramit system. The Bills of Quantities (No 6/28 of process) provided at Bill 3, page 3/21-22, for metal profiled roof cladding, for which the contractor or specialist subcontractor was to assume full design responsibility, thus making it contractor design work. The contractor was invited to submit alternative proposals; such an alternative proposal was embodied in VE Proposal 13. The pursuers' submission was that the VE Proposals were not incorporated into the contract; only the terms of the specification and Bills were so incorporated. The VE Proposals could be accepted or rejected by the architect, but only following the submission of detailed proposals by the contractor. The relevant procedures had been agreed between the architect and the defenders at a site meeting held on 25 March 1998 (No 7/13 of process, paragraph 5.3); those were followed up by the defenders' submission of their preliminary programme for Value Engineering proposals dated 3 April 1998 (No 7/19 of process). That programme allowed periods for the submission of final proposals to the client and for client approval. VE Proposal 13 contained an outline proposal for an alternative to the Stramit system that was described in the contract specification. That outline was very brief, and a fuller specification would be required in order to allow the Architect to consider whether the proposed alternative

met the visual and structural performance of the Stramit system. Consequently a detailed design proposal was required from the defenders before the proposal could be accepted or rejected.

[60] The difficulty with the foregoing argument is twofold: it fails to give effect to the manner in which the Contract Sum is calculated, and it fails to give content to the provisions of clause 14, read together with Appendices E and F. In the first place, it is clear from clause 14.6, read together with Appendix E, that the Contract Sum is calculated on the basis that all of the VE Proposals are included in the Works. That is plain from the terms of Appendix E, and also from clause 14.6 itself, which states that the Contract Sum comprises all adjustments made for Value Engineering savings. Clause 14.7 then states that the Value Engineering savings which form part of the Contract Sum are set out in Appendix F; these include VE Proposal 13. The Contract Sum is, obviously, the consideration for the Works at the time when the contract was concluded, and it is implicit in the notion of consideration that the elements that are included in the calculation of the Contract Sum will form part of the parties' contract. In the second place, if the pursuers' argument on this point is correct, it is difficult to see the point of clause 14.6 and .7. These sub-clauses deal with the VE savings in a specific manner, which is quite distinct from the treatment of provisional sums in clause 14.5. If the VE Proposals were not part of the Works agreed on in the Contract, it would have made sense to deal with them in the same way as provisional sums, with a subsequent adjustment to the Contract Sum if a VE Proposal were taken up. The incompatibility of the pursuers' argument with the structure of clause 14 is further strengthened by the provisions of clause 14.8, which deals with VE savings other than those stipulated in clause 14.7 should be dealt with distinctly. That is an indication that the clause 14.7 VE Proposals were part of the Works, unlike any other VE Proposals, which would be dealt with by an adjustment to the Contract Sum.

[61] The pursuers' argument on this topic proceeded on the premise that the VE Proposals in Appendix F were "optional", in the sense that the architect still had to decide whether to adopt them. In support of this argument reference was made to the terms of the VE Proposals; it was said that the proposals were fluid in nature, and were presented in outline form. It is true that the VE Proposals were optional, but I am of opinion that this factor is neutral in deciding whether the VE Proposals were part of the Works. The "option" in relation to the VE Proposals can be regarded as a power to adopt or a power to reject; if the option is construed as a power to reject its existence is wholly compatible with the proposition that the Appendix F VE Proposals formed part of the Works. The outline nature of the proposals themselves is not I think a decisive factor; the proposals had clearly been considered by the defenders, and sufficient description was given that the architect knew broadly what was proposed in each case. The option to accept or reject the proposals could only be exercised at a later stage, when more detail was available. At that stage, if the VE Proposals were part of the contract, a decision to reject would be a variation; if they were not part of the contract, a decision to accept would be a variation. This factor accordingly seems to me to be neutral.

[62] The pursuers further referred to the manner in which the Guaranteed Maximum Price Contract Sum was calculated in Appendix E. They submitted that the contractor had arrived at the most competitive price for the Works by pricing on the basis that the VE savings that it proposed to make would be achieved. This was described as a "business gamble" taken by the contractor, and it was suggested that it was presumably one of the reasons why a sizeable "Guaranteed Maximum Price premium" had been added to the Contract Sum. The fact that the VE savings were included in the final Guaranteed Maximum Price did not incorporate them into the contract; it rather placed an onus upon the contractor to ensure that as many as possible of its VE proposals were accepted by the employer in order to maximize the contractor's own profit.

[63] It is no doubt correct to suggest that the contractor had arrived at its most competitive price by taking the VE savings into account; reduction in the price was the obvious purpose of the VE Proposals. It is also correct to state that a "business gamble" is involved, but that is true of any tender. The Guaranteed Maximum Price premium seems to me to the just that: the contractor agreed to a cap on the price for the Works, subject to certain defined exceptions, but took a premium in exchange. The VE savings were taken into account in determining the Guaranteed Maximum Price, but that merely emphasizes the point made above: the savings were reflected in the calculation of the total Contract Sum, with all the consequences that that entails. That seems to me to point to the proposition that the VE Proposals were included in the contract Works. As to the suggestion that the VE proposals were designed to maximize the contractor's profit, it appears to me that they were designed essentially to reduce the tender price; whether this resulted in a greater profit would depend upon a range of factors as the contract proceeded. If the VE Proposals formed part of the parties' contract, any rejection of a proposal would amount to a variation, with a potential impact on the total amount payable by the employer, and also a potential impact on the contractor's profit. That it cannot be said that that was any "onus" on the contractor to have VE Proposals accepted; they might or might not increase its profit, although they would certainly make its tender price more competitive.

[64] The pursuers further submitted that the defenders' argument was incompatible with clause 1 of the Scottish Building Contract. That clause provides that "the Contractor shall carry out the Works (as defined in Appendix 1 hereto) in accordance with the Drawings numbered as per the Schedule annexed to this Contract; the Schedule of Amendments to the Building Contract and the Bills of Quantities all as annexed and signed as relative hereto". The definition of "Works" in Appendix 1 refers to "The Contract Works shown and described in the Contract Drawings and in the Contract Bills and including any changes made to these in accordance with this Contract". No reference was made in these provisions to any link between the extent of the Works and the Contract Sum. In my opinion the fact that no express reference is made to any such link in the provisions cited by the pursuers is not significant. The link exists nevertheless; the Contract Sum is paid in consideration of the performance of the Works, and that very elementary connection creates a link. This conclusion is not altered by the terms of the Contract. Moreover, I am of opinion that reliance on the Bills of Quantities is not helpful. Clause 2.2.1 of the JCT Standard Form provides that nothing in the

Contract Bills should override or modify the application of the Building Contract, the Conditions for the Appendix. The basic contractual provisions thus override the Bills. This analysis is further supported by clause 14.4 of the parties' contract, which states that the Bill of Quantities is for guidance only.

[65] The pursuers argued that the roofing work was Performance Specified Work. Performance Specified Work is identified on page 28 of the parties' version of the Scottish Building Contract (No 6/1 of process); the list includes Roofing Work, with a reference to Bill H33; this is in fact a misprint for Bill H31. Bill H31 deals with the roof cladding but not the roof steelwork. Clause 2.4.1.2 provides that Performance Specified Work should accord with any relevant specification in the Contract Documents; the Contract Documents are defined in Appendix 1 to the Scottish Building Contract as "The Contract Drawings, the Contract Bills, the Conditions, this Appendix and the Appendix II to the Building Contract". Consequently, as I understood the pursuers' submissions, the system of roof cladding must be that provided for in the contract documents rather than the defenders' VE Proposals. They relied in particular on the provisions of Bill H31, which indicates what is required by way of roof cladding, under reference to the Stramit system.

[66] Whether or not the roof cladding was properly defined in the contract as Performance Specified Work, I do not think that that has any bearing on the question that is crucial for present purposes, namely whether the parties' contract specified VE Proposal 13 or the Stramit system set out in the Bill H33. If VE Proposal 13 was included in the contract, it would override the Bills, in accordance with clause 2.2.1 of the JCT Form. In any event, when the contractor puts forward a VE Proposal, it is obvious that he is putting forward an alternative to the architect's proposals, and that that alternative is one that may or may not be accepted. In that event, the proper interpretation is in my opinion that the contractor's proposal, when duly accepted by the architect, will supersede the criteria for Performance Specified Work to the extent that it is inconsistent with those criteria. That seems to render categorization as Performance Specified Work irrelevant. In any event, I am of opinion that the pursuers have failed to establish that the roof cladding was Performance Certified Work. Performance Specified Work is defined in clause 42.1; this provides that such work must be work which is identified in the Appendix and is to be provided by the Contractor, and of which certain requirements have been predetermined and are shown on the Contract drawings and in the Contract Bills. "Contract Drawings" are defined in Appendix 1 of the Scottish Supplement as drawings referred to in the Building Contract which have been signed by the employer and the contractor or on their behalf. In the present case no such drawings were produced. It is the pursuers who assert that the roof cladding was Performance Specified Work; consequently any failure to produce drawings must in my view mean that it has not been proved that the roof cladding fell into the category of Performance Specified Work.

[67] Further to their submission that the roof covering was Performance Specified Work, the pursuers submitted that the defenders were in default, in that they had failed to carry through the various procedures required in respect of such work. In this connection, the pursuers relied on certain provisions of clause 2 of the contract conditions. Clause 2.4.4 of the contract conditions (a clause forming part of the special conditions) places an obligation on the contractor to provide the architect with all information necessary for Performance Specified Work. Clauses 2.5.1 and 2.5.2 state that the contractor is to provide the architect with drawings, specifications and details in respect of such work, in sufficient time for the architect to comment on such work in line with the contractor's programme. Clause 2.7 provides that no extension of time should be granted to the extent that there is any failure by the contractor to provide such drawings and the like. The procedures for use in respect of the VE Proposals were agreed at a site meeting held on 25 March 1998 (No 7/13 of process, paragraph 5.3.2). Those procedures were also reflected in AI 27 dated 22 June 1998 (No 6/129 of process); in that Instruction the architect accepted certain VE proposals and rejected others. At that time Proposal 13 was listed as an outstanding item; it was further indicated that initial proposals had been received and that RMJM were to respond. In respect of the rejected proposals, it was stated in the Instruction that the information currently issued for construction "remains valid". While the pursuers placed some emphasis on the latter expression, I do not think that it is of great assistance in determining what the parties' contract contained, for two reasons. First, the Instruction in question was issued some time after the contract was concluded, and thus could do no more than indicate the architect's understanding of the parties' rights and obligations. Secondly, I think it clear that the expression is used merely as a way of stating that the contractor should use the information contained in the Drawings and Bills rather than the alternative put forward as VE Proposal; that is the limit of its significance. The pursuers went on to submit that VE proposal 13 contained an outline proposal for an alternative to the Stramit system, but that further detail would be required in order to allow the architect to consider whether or not the proposed alternative met the visual and structural performance of the Stramit system. Consequently a detailed design proposal was required from the contractor. That had not been provided in sufficient time, and consequently the contractor was in default at the time when, the defenders say, a late variation was issued through the instruction to use the Stramit system.

[68] In this part of the argument the pursuers ran together provisions that related specifically to Performance Specified Work and the procedures that were agreed for dealing with VE Proposals. If I am correct that the roof cladding was not Performance Specified Work, the provisions relating to such work are not relevant. I think that the argument can be advanced, however, on the restricted basis that the VE procedures were not followed by the defenders (see No 7/351 of process, page 9). It is true that the VE procedures set out in the minutes of the site meeting of 25 March 1998 (No 7/13 of process, pages 5-6) do not appear to have been strictly followed in relation to VE 13. Nevertheless, it seems to me that the critical feature of the procedures agreed at that meeting was that a contractor presenting a VE proposal should do so "with enough detail to effect a considered response". Thereafter the design team and the pursuers are to consider the proposal and either refuse it or approve it in principle, or approve it with

comments; the contractor is then to develop a proposal in more detail with the assistance of the design team, and final agreement is to follow that (paragraph 5.3.2). VE 13 was considered at the Value Engineering meeting held on 3 June (No 7/24 of process, page 3, paragraph 2.10). The comment against this item (quoted below at paragraph [72]) is that VE 13 was agreed, subject to the defenders' confirming that it did not affect the lightning protection and picking up any changes in the roof pitch on the fabricators' drawings. Mr Dibben was the only witness who attended the meeting. He stated that, subject to the comments made in the above extract, it was agreed to proceed with the VE proposal. The pursuers submitted that the true meaning of the entry in the minutes was that RMJM had agreed to the proposal in principle but that the defenders were to provide further detail to back it up and to allow for a proper consideration of the proposal by RMJM. In my opinion that submission is unfounded. In the first place, it is contrary to Mr Dibben's evidence; in the second place, it runs contrary to the plain meaning of the wording used in the note at paragraph 2.10 of the minutes, which indicates agreement subject to confirmation regarding the lightning protection. It seems clear, therefore, that by this stage RMJM considered themselves to be in a position to agree VE 13. That indicates that it was unnecessary to go through the more elaborate procedures agreed at the site meeting of 25 March, and that RMJM were content not to go through with those procedures. Furthermore, it appears from the terms of AI 27 (No 6/129 of process), issued on 22 June 1998, that RMJM accepted that they were due to respond; the comment in that Instruction is "Initial proposal received. RMJM to respond". Mr Cornish (day 2, 3.36) stated that in late June that had been no indications from RMJM that a decision on the roof was impossible because the defenders had not sent the necessary information. In these circumstances I conclude that consideration of VE 13 was not held up by any failure on the part of the defenders to follow through the formal procedures relating to VE proposals.

History of instructions relating to the roof steelwork and cladding

[69] On 8 May 1998 RMJM issued a drawing 1056(26)003 (No 7/20B of process); this was issued together with AI 17, and had the status of an instruction. The drawing showed the gable elevations of the roof steelwork, and indicated a roof pitch of 2.3°. This was consistent with the Stramit system, but was not consistent with the form of roofing proposed in VE Proposal 13; the latter specified that for the built-up roof system the minimum roof pitch was 6° (see Mr Whitaker, day 14, 3.25). The change in angle was significant for the fabrication of the roof steelwork because it affected the lengths of beams and columns and the details of the various joints (Mr Whitaker's report, No 7/8 of process, paragraph 2.32). Evidence to similar effect was given by Mr Cornish (day 2, 2.21). Mr Lowe agreed (day 25, 2.40). It seems to me that this point is clear as a matter of elementary geometry.

[70] On receipt of the drawing 1056(26)003, the defenders passed it to their steelwork fabrication subcontractor, Zonner Industries Limited. On 13 May 1998 Zonner sent the defenders a fax (No 7/30 of process) in relation to the drawing. In that fax Zonner stated that they were unable to start working on their own details for the steelwork because certain details were not given in the architect's drawing. Mr Whitaker (day 11, 11.16) explained the methods of working of steel fabricators; they have to produce fabrication drawings showing all work that has to be done to each steel member; that includes the precise length, the angle of the cut ends, details of the plates that are welded to the end for fixing the beam to the column, and details of holes for bolts. Because of the computerized system of design that is used by fabricators, it is impossible to produce the final cutting list until all of the necessary information is available. Consequently Zonner would require the information listed in their fax in order to start their own design work. Mr Lowe in cross-examination broadly agreed that the information requested would be necessary to permit the steelwork fabricator to design the steelwork connections (day 25, 2.20 onwards). Mr Lowe further stated that the necessary details would be provided by the structural engineer.

[71] In response to Zonner's fax, RMJM acting in their capacity as structural engineer sent the defenders a fax dated 15 May 1998 (No 6/354 of process). In relation to two of the details requested by Zonner (connection details and connection details for cantilevers to concrete), RMJM stated that a drawing indicating the relevant joint loads would be issued "next week". It follows that at this time the design team had not produced sufficient information to permit the steelwork fabricators to start fabrication using the Stramit system. A site meeting took place on 20 May 1998. In the minutes (No 7/15 of process, paragraph 3.1.4) it is recorded that the defenders were keen to conclude value engineering discussions and that RMJM agreed to issue instructions, which were to be accepted or rejected within a week. There is no suggestion in the minute that the architect required any proposals or details from the defenders in relation to any of the VE Proposals in order to allow such an instruction to be issued. At this time no decision had been intimated on VE Proposal 13; consequently the undertaking to issue instructions applied to that proposal.

[72] In fact no instructions were issued by the architect during the course of the following week. On 28 May 1998 the pursuers' cost consultants, Gardiner & Theobald, wrote to the pursuers with a report on value management strategy. On 29 May RMJM as structural engineer issued certain further drawings to the defenders (drawings 1056(26)002 and 004). These drawings contained the connection load details requested by Zonner in their fax of 13 May (Mr Whitaker, day 18, 2.27; Mr Lowe, day 25, 2.44). Those drawings were consistent with drawing 1056(26)003, which indicated the roof pitch as 2.3°, consistently with the Stramit system. Thereafter, on 3 June 1998, a meeting was held to discuss Value Engineering issues; the minutes are found at No 7/24 of process. The meeting was attended by Mr Dibben, who gave evidence about it (day 9, 12.20 onwards). At the outset of the meeting, according to the minutes, a representative of Gardiner & Theobald indicated that this was probably the last major chance that the project team would have to consider any VE savings; he further suggested that the existing schedule of VE Proposals had to be agreed and signed off or rejected. Item 2.10 provides as follows:

"VE Item No 13 - Change roof cladding specification to a built up system.

Agreed. SCL [the defenders] to confirm that it does not affect the lightning protection. SCL to pick up any changes in the roof pitch on the fabricators drawings".

Mr Dibben stated that, as recorded in the minutes, it was agreed that the defenders should proceed with VE Proposal 13. Mr Cornish also stated in evidence that that was his understanding of the position (day 2, 3.16). In the minutes no indication is given that any further details or proposals were required from the defenders in respect of VE Proposal 13; on the basis of the terms of the minutes and Mr Dibben's evidence, I conclude that at the VE meeting it was decided that the Proposal 13 was to go ahead. The minute further states, at paragraph 3.0, that RMJM were to issue Architect's Instructions as appropriate to cover all of the items discussed.

[73] A further meeting at which certain VE Proposals were discussed was held on 17 June 1998. Mr Cornish (day 8, 3.13) stated that VE Proposal 13 was not discussed at this meeting. Subsequently, however, on 22 June 1998, RMJM issued Architect's Instruction No 27 (No 6/129 of process). In that Instruction RMJM specified certain VE Proposals which had been accepted and were to be incorporated into the contract works. On pages 4 and 5, VE Proposals that were said to be "outstanding" were listed; these included the Proposal No 13. That does not seem consistent with the minutes of the meeting of 3 June, and is contrary to Mr Dibben's evidence. The Architect's Instruction nevertheless narrated, on page 5, "Initial proposal received. RMJM to respond". That appears to indicate that RMJM did not require further information from the defenders to reach a decision on roof cladding. Thereafter, RMJM sent the defenders a letter dated 24 June (No 7/25 of process; the letter was received on 27 June). In this they stated:

"I have recommended to First Stop Hotels [the pursuers] that we retain the use of speedeck to the main roof. I will advise you of an instruction as soon as I can".

In relation to that letter, Mr Cornish commented (day 2, 3.32) stated that his reaction was "exasperation". He stated that the situation was that the defenders had no direction as to which way to go, because RMJM had not made their mind up. The next communication from RMJM to the defenders was a fax dated 29 June (No 7/26 of process). This stated

"I confirm my telephone call of Friday 26 June advising that First Stop Hotels have agreed that the roof specification as currently instructed (Stramit Speedeck) is not to be replaced by any alternative".

[74] The defenders wrote (No 7/27 of process) on the same date to their roofing subcontractor, Kelsey Roofing Industries Ltd, to confirm that it was the defenders' firm intention to enter into a subcontract with them for the roofing works. The letter went on to state that the specification would be as discussed at a meeting of 17 June, and that the architect had confirmed that the Speedeck roof option was to be adopted. Mr Cornish indicated that no order had been placed with Kelsey because that would depend upon the outcome of RMJM's decision (day 2, 3.50); a subcontract had been concluded with Kelsey as soon as the defenders knew what was to be built. Mr Cornish was then asked whether he was satisfied that the regular progress of the pursuers' works was affected by this. Mr Cornish replied in the affirmative, and stated that all of the activities concerned were on the critical path. At this stage he had realized that it was impossible to get the steel and cladding in time, and he was satisfied that this factor affected critical activities. Mr Cornish returned to this matter in re-examination (day 8, 3.18). He stated that meetings had been arranged with Kelsey and Zonner, at which issues had been raised regarding purlin spacings; the defenders were pursuing RMJM to clarify structural details. Those details were needed by Kelsey and Zonner for their shop drawings. Load calculations were also needed from RMJM. The purlin fixings had in fact been raised by Zonner in their fax of 13 May. In a subsequent fax of 15 May (No 6/354 of process) RMJM had indicated that the purlin detail would be changed. The relevant drawing (1056(26)003, revision A) was nevertheless issued to the defenders on 9 July 1998; that appears from the drawing register (No 6/355 of process). The copy of that drawing found as No 7/20B of process bears a date stamp which indicates that it was received by the defenders on 10 July; that is consistent with issue on 9 July. That indicates that adequate information for steelwork fabrication using the Stramit Speedeck system had not been issued by RMJM until 9 July.

[75] The connection loads were provided by RMJM in a fax dated 13 July (No 7/32 of process), and certain further details were provided in a fax from RMJM dated 17 July (No 7/34 of process). In relation to these documents, Mr Cornish stated in evidence (day 8, 3.23) that it was following the revisions of drawings at this time that Zonner had everything that they needed. The final version of the drawings, referred to in the fax of 17 July, indicated co-ordination between the steelwork (Zonner's responsibility) and the roofing work (Kelsey's responsibility); the further detail provided at this stage was essential for the shop drawings. That evidence was not contradicted and I accept it. I accordingly conclude that the defenders' subcontractors were not in a position to prepare shop drawings to enable fabrication to take place until after they received the information provided with RMJM's fax of 17 July. On 20 July the defenders passed a copy of RMJM's fax of 17 July to Zonner and Kelsey (No 7/33 of process); in that fax it was indicated that the relevant drawings would follow as soon as they were received by the defenders. Kelsey responded to that fax by letter dated 30 July 1998 (No 7/28 of process, in which they indicated that they would progress the works on the basis set out in the letter.

Application of clause 25 to roof of steelwork and cladding

[76] Clause 25 is set out at paragraph [9] above. The defenders' claim for an extension in respect of roof steelwork and cladding is made on the basis that there occurred a Relevant Event of the sort specified in clause 25.5.5.6. In short, it is contended that the architect, RMJM, failed to provide the necessary instructions to the defenders in due time; there were the instructions to use the Stramit system rather than the VE proposal that was included in the contract (see paragraph [53] above). To establish such a claim the defenders must show, first, that they made a specific application in writing to the architect for such instructions; secondly, that such application was made on a date which

having regard to the Completion Date was neither unreasonably distant from not unreasonably close to the date on which information was required; and thirdly that they did not receive the necessary instruction in due time.

[77] The defenders' original construction programme indicated that roof steelwork was to start on about 27 July 1998 (No 7/19/2 of process). Mr Cornish gave evidence (day 2, 3.43) that on that programme the time required for procurement of steelwork should have been 12 weeks. On that basis information should have been provided in mid May, on 11 May or during the week or so afterwards; the latest possible date was 18 May. The successful subcontractor would have required a 10 week lead-in period. Mr Whitaker in his report (No 7/8 of process) expressed the opinion that a reasonable date for receipt of the information relating to the roof was 11 May 1998 (paragraph 2.40, subparagraph 6 and the accompanying table). In evidence, Mr Whitaker stated (day 11, 12.26) that he agreed with Mr Cornish on this matter.

[78] The defenders' application for information relating to the steelwork was contained in an Information Required Schedule (No 7/114 of process), with an accompanying Package Procurement Schedule. This Schedule was dated 26 January 1998. It stated at the outset that the date on which information was required reflected the date for issue of construction drawings. In relation to roof steelwork, the Package Procurement Schedule indicated that full information should be available by 8 April in order that tender documents might be issued by 15 April and an order placed by 6 May. It was envisaged that steelwork would start on site on 29 July. In my opinion this document was a sufficient application in writing to satisfy the second of the requirements of clause 25.4.6. So far as the third requirement is concerned, that the timing of the written application should be reasonable, no suggestion was made to the contrary, and I find that the application was neither unreasonably distant from nor unreasonably close to the date on which information was required.

[79] Neither Mr Whitaker nor Mr Cornish maintained that full information relating to roof steelwork should have been available by 8 April, the date in the Package Procurement Schedule; both favoured a date of approximately 11 May. I accept their evidence on this matter; I consider that such a date would have been reasonable in all the circumstances. In this respect I rely in particular on the evidence relating to the lead-in period required for steelwork; 10 weeks was reasonable for this purpose. On this basis I conclude that the defenders did not receive the necessary instructions from the architect in due time. The architect's instruction relating to the roof cladding system that was to be adopted was only received on 29 June 1998 (see paragraph [73] above), and in fact full details were only provided later, by 17 July (see paragraph [75]). Even on the first of these dates, 29 June, I am of opinion that the instruction was not issued in due time. Given a typical lead-in period of 10 weeks, with an additional two weeks being required for the tendering process, I consider that that instruction was wholly incompatible with the defenders' programme, which at that time showed that steelwork was due to start on 27 or 29 July 1998; the original construction programme stated that roof steelwork was to start on 27 July (No 7/19 of process); the Package Procurement Schedule forming part of the defenders' Information Required Schedule (No 7/114 of process) indicates that roof steelwork was due to start on 29 July; I do not regard the difference between these two dates as material for present purposes.

Consequences of late instruction

[80] Steelwork was delivered to the site on 1 September 1998, and Zonner started erection the following day, 2 September. This was five weeks later than planned. Mr Whitaker expressed the opinion that a five-week delay to the start of steelwork erection had been caused by the late instruction issued by RMJM (report No 7/8 of process, paragraphs 2.39 and 2.40; in evidence, day 11, 12.27). Zonner in fact managed to accelerate the fabrication of the steelwork; at the site meeting held on 15 July the defenders had reported that, as a result of the late decision in relation to roofing specification, it was unlikely that roof structural steelwork would begin until 7 September (No 7/35/33 of process). In his evidence, Mr Cornish agreed with Mr Whitaker's conclusions on this matter (day 3, 11.14 onwards). He stated that no order could be placed with Kelsey, the cladding subcontractor, until a clear instruction was obtained from the Architect in relation to the roof cladding system (day 2, 3.50). Mr Cornish was asked (day 3, 12.22) whether he was satisfied that the defenders had been delayed in completion by the late Architect's Instruction relating to the roof specification. He replied that he was totally satisfied. He further indicated that he was satisfied that the delay arose entirely from the lateness of the instruction, as against its content.

[81] Mr Whitaker expressed the view (report No 7/8 of process, paragraphs 2.17, 2.41) that the roof steelwork and roof coverings were critical to the completion of the works. He gave two reasons for this conclusion. First, the roof coverings provided a partial weather tight state so that fitting-out of the building could progress. Secondly, the roof coverings formed the plant room, where all the service plant and equipment was housed and to which all of the pipework and electrical and communications cables were connected. Mr Whitaker stated (first report, No 7/1 5/6 of process, paragraph 2.12; in evidence, day 10, 12.12 onwards) that the erection of roof steelwork was a critical milestone in the project; any delay in the steelwork would result in delay to completion of the Works as a whole. The ability to construct the roof cladding was directly dependent upon the roof steelwork, and the cladding enclosed the plant room, which was of major significance in a highly serviced building. Mr Cornish agreed that direction of the roof steelwork was a critical activity, for broadly similar reasons to those given by Mr Whitaker (day 2, 11.20 and 11.41).

[82] Mr Lowe expressed a contrary view. He was of opinion that the roof steelwork and coverings were not on the critical path, and thus could not have caused delay to completion of the Works. The reason for this view was that, at the instigation of Mr Cornish, temporary weatherproofing had been installed at fourth floor level and then, as construction proceeded, at sixth floor level (day 3, 11.44). In their Project Manager's Summary for August 1998 the

defenders advised the architect that they intended to use temporary sheeting at sixth floor level to allow first fix services to proceed on the fourth and fifth floors by 1 September (No 7/3 of process). Thus adequate weatherproofing had been installed to enable mechanical and electrical works to proceed at lower levels. Those works hand started on 31 July 1998, by comparison with a planned start date of 2 July 1998, as a result of late completion of the reinforced concrete frame. Nevertheless, Mr Lowe was of opinion that thereafter it had been possible to proceed with the first fix mechanical and electrical works.

[83] On this matter, I prefer the views of Mr Whitaker, as supported by Mr Cornish. It is clear that the hotel was a heavily serviced building. The mechanical and electrical plant was situated in the roof space; consequently the provision of a roof covering was critical to the installation of that plant, which was obviously highly susceptible to wet conditions. This is made clear by photographs that were spoken to in evidence; in a photograph at sixth floor level taken on 15 September 1998 a considerable amount of water is seen lying on top of the building as a result of rain (No 6/39 of process). In addition, the mechanical and electrical plant and equipment required to be connected to the services running through the building. These were accommodated in a number of risers which ran down from the roof space, before branching out into individual rooms and public areas. Those risers were obviously highly susceptible to weather penetration. While some degree of protection was obviously provided by the temporary sealing, the plant and equipment in the plant room could not be connected until the roof covering was in place. This appears to me to be a matter of common sense. In addition, this conclusion is supported by two further considerations. First, in his evidence Mr Cornish stated (day 3, 11.59) that the plant was originally placed in the plant room in its wrapping or casing; once the liner sheet (the lower sheet) of the roof cladding was in place, however, the protection was removed, the plant was secured and the work of connection began. That supports the general view that the roof coverings were critical. Secondly, the defenders' daily reports and site diaries indicate the numbers of electricians and heating engineers employed on site on each day of the construction of the mechanical and electrical work. These figures were analyzed by Mr Whitaker (No 7/8 of process, paragraph 2.43, and graph on page 7/8/20). This analysis disclosed that, one week after the start of the roof coverings, the numbers of electricians and heating engineers doubled. The number of electricians and heating engineers employed on site remained high thereafter. The increase is shown very clearly in the graph on page 7/8/20, which indicates daily totals of electricians and heating engineers; in the week beginning 14 September the average number employed was 12 or 13, whereas in the following week, and every week thereafter until March 1999, the average was at least 20 and in most cases significantly more than that. It is significant that the increase was sudden rather than progressive. In my opinion it is reasonable to draw from these figures the inference that greatly increased levels of mechanical and electrical work were possible as a result of the placing of the roof coverings. In my view this strongly supports the conclusion that I have reached.

[84] In his report (No 6/351 of process, page 1, at paragraph 1.7) Mr Lowe advanced a number of arguments which, he said, led to the conclusion that the defenders could not have proceed with the steelwork any earlier than they actually did.

1. Mr Lowe relied first on the fact that the fire escape stairs above sixth floor level had not been constructed. In my opinion this point is not relevant. Mr Whitaker stated that it was obvious that, if the roof steelwork had been available any earlier, the concrete stairs could easily have been finished (day 13, 2.10). Mr Cornish gave evidence that the fire escape stairs were built off the critical path (day 5, 10.52). Moreover, in cross-examination (day 25, 11.16), Mr Lowe accepted that, if the stairs had not been completed, the defenders could have started the steelwork in a different area and come back to the area immediately adjacent to the fire escape stairs at the end. For these reasons I do not think that this point is established.

2. Mr Lowe further relied on the construction of the lift shaft above sixth floor level, which was not completed until August. Mr Cornish gave evidence that, if there had been a problem with this matter, he would have ensured that propping was used to take the load from the steelwork, so that the lift pit could be cast at a later date (day 5, 10.55). Mr Whitaker agreed with that suggestion (day 13, 2.23). Mr Lowe disagreed with these views. On this matter I prefer Mr Cornish, who was actually on site at the material time, and Mr Whitaker. I accordingly conclude that this point is not established.

3. Mr Lowe relied on the fact that the upstand walls around the perimeter of the sixth floor had not been constructed; these were required to bear the weight of the structural steel in the roof. Mr Lowe relied in particular on the fact that the upstand walls had not been completed until 28 August 1998. In this connection, two points are significant. First, the Clerk of Works' diary indicates that the only walls that were not constructed on 28 August were those around the chiller area; it seems clear that the walls around the perimeter were constructed earlier. Secondly, Mr Lowe's evidence was based on the fact that the walls were only completed on 28 August. Mr Cornish, however, gave evidence (day 3, 12.10) that the defenders only needed one third of the upstand walls to be constructed to allow the erection of the structural steelwork to begin. He further stated that he would have taken any opportunity to construct the steelwork earlier if that had been possible, and he rejected the suggestion that the upstand walls had been responsible for the late erection of the steelwork. Mr Whitaker (No 7/8 of process, paragraph 2.49) stated that the perimeter walls on which the steelwork was founded were all completed by 20 August. He further stated that steelwork erection could have started before all of the perimeter beams were cast so long as matching beams were built on either side. On that basis Mr Whitaker thought that steel erection could have started as early as 10 August were it not for the delay in fabrication caused by the late issue of the architect's instruction to use a Stramit system. Mr Whitaker spoke further to this matter in evidence (day 13, 2.29; day 15, 2.51). Furthermore, the architect stated in a letter to the defenders dated 19

October 1998 (No 7/157 of process) that "Completion of the reinforced concrete edge beams sufficient to receive the Roof Steelwork was achieved on 12th August 1998". Mr Whitaker derived further support for his view that the upstand beams were not critical from the fact that the number of carpenters and steelfixers engaged on the project reduced steadily during the last four weeks of construction of the reinforced concrete frame (3 August-28 August). If the upstand beams had been critical, he would have expected that the numbers of men employed in those trades would have been maintained in order to ensure completion of the reinforced concrete works as soon as possible (No 7/8 of process, paragraph 2.50). I accept Mr Whitaker's evidence on these matters. I accordingly consider it clear that the roof steelwork could have started well before completion of the perimeter walls; I am further of opinion that the perimeter walls were completed on 12 August. On this basis I conclude that there is no substance in the argument that steelwork erection was delayed by the completion of the perimeter walls.

4. The fourth point made by Mr Lowe was that the roof steelwork could not start earlier because falsework and formwork used in constructing the sixth floor slab required to be removed from beneath the sixth floor. Mr Whitaker's view was that it was not necessary to remove the falsework and formwork from below sixth floor level to allow steel erection at that level (day 13, 2.34). Mr Cornish (day 3, 12.20) stated that the erection of steelwork could have proceed despite the falsework and formwork below sixth floor level. The falsework and formwork could have been removed in three ways; the tables could have been stripped in situ at fifth floor level; the tables could have been removed from the building by crane to Church Street, a nearby street, and dismantled there; or the tables could have been removed intact, placed on a flat bed lorry and driven to a remote part of the site for dismantling. In my opinion it is clear that the existence of the falsework and formwork at fifth floor level would not have prevented the construction of the steelwork. I further conclude that it could have been removed using one or other of the methods described by Mr Cornish.

5. Mr Lowe's fifth point was that the roof space at sixth floor level was used by the reinforced concrete subcontractor, E P Rothwell & Sons, to strip formwork and formwork tables until the steel arrived on site. Mr Cornish gave evidence that Rothwell simply took advantage of the roof space because it was known that the steel would not be available until a later date (day 3, 12.16). He further stated that, if it had been necessary, the falsework and formwork could have been dismantled in any of the three ways described in paragraph 4 above. Mr Whitaker's evidence was broadly in agreement with Mr Cornish. I accept Mr Cornish's evidence on this matter, and I conclude that this point is not established.

6. The sixth argument relied on by Mr Lowe was that, for the steel erectors to start work, it was necessary that an access scaffold should be constructed to provide a safe system of working for them; this would include a cantilever for the roof overhang. Mr Cornish gave evidence that the access scaffold was built for the cladding contractor (day 5, 11.04), and in particular to enable the construction of louvres. The steel erectors were permitted to use it, but it was not for their benefit. Without it, they could have proceeded with steel erection using harnesses, lanyards or roof mounted cherry pickers; that would have been a safe method of working. Mr Whitaker agreed with that evidence (day 13, 2.40). Mr Lowe disagreed with the position taken by Mr Cornish. He accepted, however, that cherry pickers could be used if they could be put in place (day 25, 12.15). On this .I prefer the evidence of Mr Cornish and Mr Whitaker. Mr Cornish was on site at the relevant time, and I find that he gave his evidence by reference to the actual conditions that he experienced. I am satisfied that one of the methods that he suggested could have been used without difficulty.

7. Mr Lowe's final point related to the provision of suitable cranage for the steel erection. Mr Lowe suggested that the tower crane on site could not service both the concrete walls at roof level and the steelwork at the same level. Mr Cornish gave evidence that the steel erectors would have been given preference over any other trades; in any event the crane could have been used before 8 a.m. or after 4 p.m. (day 5, 11.07). In addition, Mr Lowe (day 25, 12.43) accepted that a concrete pump could have been used for the concreting works. On this matter I accept the evidence of Mr Cornish, and I find that the point has not been established

Extension of time

[85] For the reasons stated above, in particular at paragraphs [80] and [81], I am of opinion that the Works were delayed due to the late instructions given by the architect in respect of the roof steelwork. That entitles the defenders to an extension of time, and the next question is how long that extension should be. Mr Whitaker dealt with this matter in his report No 7/8 of process, at paragraph 2.48:

"Having carefully considered all of the above facts, I am of the opinion that the roof steelwork and the roof cladding were critical to the completion of the Works. I am further of the opinion that these critical tasks commenced 5 weeks later than planned and that being critical tasks this caused a five week delay to completion of the whole of the Works".

Mr Whitaker developed this matter at paragraph 2.53. He was of opinion that the defenders were delayed in the completion of the Works until 1 March 1999 as a result of the delay in issuing an instruction relating to the roof steelwork. He further considered that the delay was caused entirely by the lateness of the instruction to vary the roof coverings; it did not result from the content of the work instructed. In support of this proposition Mr Whitaker produced a short as-built programme (at paragraph 2.53) which indicated that the duration of the installation of the roof steelwork and roof coverings was in fact exactly the same as the duration planned by the defenders, 181 days. I accept Mr Whitaker's evidence on these matters. I find that the completion of the Works was delayed by five weeks as a result of the late instruction relating to the late instruction relating to the roof cladding system. I further find that the delay was caused by the lateness of the instruction and not by its content. Finally, I should record that it

is conceded by the defenders that the 3 1/2 week delay resulting from the instruction of the gas venting scheme is contemporaneous with the five week delay resulting from the late instruction of the system of roof cladding.

Instructions following replacement of RMJM by Keppie

[86] After the roof cladding had been put in place Mr Whitaker's evidence was that work on the project became much more intensive (No 7/8 of process, paragraph 2.54). His view was based on the defenders' daily diary and report sheets and the Clerk of Works' diary. Both the defenders and the Clerk of Works, Mr Foley, reported at meetings that the Works were proceeding approximately 5 weeks late. On 4 November 1998 the defenders indicated that their target date for completion was 1 March 1999, and Mr Foley expressed the view that the Works were 5 1/2 weeks behind programme (site meeting No 10, 4 November 1998, No 7/42 of process). At the next site meeting, No 11, held on 2 December 1998, the pursuers indicated that RMJM's appointment as architect, structural engineer and mechanical and electrical engineer had been terminated by the pursuers with immediate effect. Keppie Architects had been appointed as architect and Blyth & Blyth had been appointed as structural engineer and mechanical and electrical engineer. At paragraph 3.1.1 of the minute of the meeting (No 7/43 of process) it is recorded that

"[The defenders] noted the [pursuers'] change to the Design Team and felt that their concerns at his change so late in the contract should be recorded. They would of course do their best to assist the new design team members".

In his evidence Mr Cornish stated that he wanted the defenders' concerns to be recorded because a lot of unresolved issues existed and a new design team would be coming on to the project without any initial knowledge of it; indeed they did not even have the project drawings and documentation (day 3, 1.51 onwards). Mr Cornish added that it was obvious at that site meeting that the new design team knew nothing about the job; they had asked the defenders to photocopy all the documentation and courier it to them; the defenders did that. Neither Mr Cornish nor Mr Whitaker had ever encountered such a situation previously in their careers. At the site meeting held on 2 December the defenders stated that they continued to be 5 1/2 weeks behind programme and had issued a 57-week target programme. Mr Foley agreed that the Works were 5 1/2-6 weeks behind programme.

[87] The defenders contend that, following the change of design team, a substantial number of items were instructed late. These, it is said, had an effect on the completion of the contract Works, and constituted Relevant Events for the purposes of clause 25. The defenders' contention was first advanced at site meeting No 13, held on 3 February 1999 (No 7/45 of process). At that meeting the defenders reported that the anticipated completion of the Works could not be foreseen before 15 March owing to various items listed in their report. Those include the nine items discussed in the following paragraphs.

1. Final fix items to en suites

[88] The Works did not originally include the installation of fittings into the shower rooms attached to the hotel bedrooms (referred to in the documentation as en suites). At site meeting No 9, held on 7 October 1998, the minutes record (No 7/46 of process, at paragraph 3.15) that the defenders provided a schedule of fixtures and fittings to enable the fit-out of the interior to be discussed to ensure that responsibility for supply and installation was clear and to plan the installation programme. The minutes further record that installation for each item needed to be confirmed by the pursuers, and that RMJM were to co-ordinate matters. The schedule produced at that meeting referred to certain final fix items in the en suites (No 7/40 6/14 of process). In the action column, it was recorded that further action was required by the pursuers (to confirm installation) and RMJM (to co-ordinate matters). Mr Lowe in cross-examination (day 26, 11.04) accepted that the obligation to provide information and instructions lay on the defenders. Mr Cornish (day 3, 2.24) stated that he was anxious to have this subject clarified, and that is why he had produced the schedule at the site meeting on 7 October. He was further anxious to establish responsibility for the supply of the items to be fitted, because frequently an employer would obtain these itself and issue them to the contractor. Mr Cornish referred to the matter again in a letter to RMJM dated 30 November (No 7/47 of process). In evidence, he explained that the lack of clarity regarding fittings created a problem because of the need to deal with 168 bedrooms in the hotel, with consequential problems of out-of-sequence working and additional snagging (day 3, 2.29). Mr Lowe generally agreed with this attitude (day 26, 11.10). On 16 December Mr Cornish sent a fax (No 7/49 of process) to Keppie indicating that the final fix items to the en suites could not be deferred any longer. An instruction was requested.

[89] On 13 January 1999 Keppie issued an instruction in relation to the final fix items to the en suites (No 7/50 of process). The items in question were, for each bathroom, a holder for the lavatory roll, a towel rack, a grab bar, a robe hook, a glass shelf and a shaving mirror. That instruction was superseded by a further instruction issued on Friday, 22 January (No 7/51 of process). The latter instruction was in fact issued on the last working day before the Completion Date, which was Monday, 25 January. The instruction of 25 January was to supply and install the items specified, and not merely to install items supplied by the pursuers. The instruction was based on information obtained from the interior designers, Thompson MacLeod; all but one of the suppliers named by Thompson MacLeod envisaged a lead-in time of 21 days from the date of the order. The consequences of this instruction for the pursuers are set out at some length in a letter to Keppie dated 8 March (No 7/55, or 7/147, of process). That letter began by giving notice that, in accordance with clause 25, notice was given that the progress of the Works was likely to be delayed owing to the circumstances set out in the letter. In relation to the en suite fittings the letter provided as follows:

"On 13th January 1999 Keppie Architects wrote to SCL instructing us to order the following:

i. Toilet roll holder - Anticipated delivery 10 days = due 23rd January 1999.

ii. Towel rack - Anticipated delivery 21 days = due 3rd February 1999.

iii. Grab bar - Anticipated delivery 21 days = due 3rd February 1999.

iv. Robe hook - Anticipated delivery 10 days = due 23rd January 1999.

v. Glass shelf - Anticipated delivery 10 days = due 23rd January 1999.

vi. Shaving mirror - No delivery period quoted.

On 22nd January 1998 Architects issued further instructions, these included updated quotations stating that all items except the shaving mirror are subject to a 21 day lead-in period.

On 3rd February 1999 we received further verbal instructions from Keppie Architects to fit 2 soap dispensers to each en-suite. These were delivered in due time.

The shaving mirrors were delivered in good time. However, all other items were not delivered until 9th February 1999

The further delaying factor was that delivery of items i, iv and v was received 17 days later than quoted by Keppie in their letter of 13th January 1999 and delivery of items ii and iii was 6 days later than quoted by Keppie in their letter of 13th January 1999.

Further to the delayed deliveries, revised instructions were issued regarding fixing of the items. Thompson MacLeod confirmed fixing positions of items ii, iii, iv and v and soap dispensers on 9th February 99. The other items started on 10th February 1999.

Thompson MacLeod subsequently gave verbal instructions changing heights for the toilet roll holder on 12th February 1999. This was confirmed by facsimile on 16th February 1999.

The security screws supplied for the shaving mirrors were unsuitable for the locations in the en-suites. SCL had to order new security screws for all the shaving mirrors. These were delivered on 16th February 1999.

On the 16th February 1999 we were able to start revisiting all areas to fix items i and vi.

As previously mentioned, fixing of item v (glass shelf) started on 10th February 1999. It became immediately apparent that the shelf specified by Thompson McLeod and Keppie was too large to fit in the en-suite bathroom. SCL immediately sent a facsimile to their shelf manufacturer to try and resolve the problem, we also investigate[d] sourcing shelves from an alternative supplier. Following discussions Thompson MacLeod issued their revised requirements on 15th February 1999. At the time of writing the new shelves have not been delivered.

The installation of all the available en-suite fittings was completed on 26th February 1999. Fitting of the outstanding glass shelves will be carried out within one week of delivery.

We anticipate the shelves will be delivered before 8th March 1999, therefore installation should be complete by 15th March 1999".

Mr Cornish, who was the author of that letter, spoke to its contents (day 3, 3.18). On the basis of his evidence, I am satisfied that the statements of fact in the letter are substantially accurate.

[90] Mr Cornish (day 3, 2.46 onwards) explained that the defenders had envisaged finishing rooms and snagging them on a floor by floor basis; thereafter the rooms would be locked so that one could gain entry and damage the work that had been done. Because of the difficulties mentioned in the letter that was not possible; it was necessary to keep going back into bedrooms and bathrooms in order to install each successive item as it arrived. The problems were summarized in Mr Cornish's project manager's report to the site meeting held on 3 February 1999 (found at No 6/17 of process). Repeated snagging became necessary, which had a serious effect on the defenders' ability to progress the Works (day 3, 3.02). Mr Cornish's opinion was that the instruction relating to en suites had critically affected the defenders' ability to deliver the en suites and the bedrooms. Mr Lowe (day 26, 11.05) would not accept that the activities were such that damage would inevitably occur in the situation described by Mr Cornish. He thought that tradesmen should be able to work with sufficient care to avoid any significant problems. On this matter I prefer the evidence of Mr Cornish. It seems to me that a degree of damage would be almost inevitable if items such as those described in the relevant Architect's Instructions were installed in bathrooms. That would require checking the state of the rooms and consequential snagging work. In this connection, I think that it is significant that Mr Cornish was an experienced site agent and manager, and clearly spoke from his own experience on the project. Mr Lowe, by contrast, appeared to be speaking from a more theoretical point of view, and in my view he assumed that tradesmen would take a greater degree of care than can realistically be expected.

[91] Mr Cornish gave evidence that a reasonable time for instruction of the en suite fittings would have been ten weeks prior to the Completion Date (day 3, 3.00) that would have been in late November 1998. He explained that that would have enabled the defenders to start the process of ordering the fittings earlier; they would thus have secured delivery at an earlier stage. This would have helped the defenders to complete the rooms systematically, floor by floor, and to lock rooms once they had been completed. Mr Whitaker's evidence (report, No 7/8 of process, paragraph 2.70 and accompanying table; day 15, 3.45) was that a reasonable date for issuing the instruction would have been 16 November 1998. Mr Lowe (day 26, 11.36) stated that he did not accept that the instruction on this matter was late. He qualified that by stating that it was late "as defined", but it did not delay completion. He clarified the expression "as defined": it meant an instruction which was late in terms of clause 25 because the contractor had requested it in writing. The schedule produced at the site meeting of 7 October 1998, which was made available to RMJM, listed the items on which an instruction was required. Before that date, the defenders had produced an Information Required Schedule (No 7/114 of process) which included a request that information relating to sanitary ware should be provided by 10 August 1998. Mr Cornish stated in evidence that that request

covered final fix items to the en suites (day 3, 2.15). In these circumstances I am of opinion that the defenders made a written request for the relevant instruction, as required by clause 25.4.6.

[92] I accept the evidence of Mr Whitaker, which was supported by the evidence of Mr Cornish, that the instruction should have been issued on or about 16 November 1998. On that basis I consider that the written request for an instruction was made within a reasonable time of that date, as required by clause 25.4.6. I accordingly conclude that there was a Relevant Event in terms of that clause, namely a late instruction in relation to the final fix items to the en suites. I am further of opinion that that Relevant Event caused completion of the Works to be delayed beyond the Completion Date. The tasks required following the instruction were described by Mr Cornish, in the evidence summarized above. These began with ordering the relevant items, with a consequential lead-in time. Mr Cornish's view was that the bathroom fittings were critically important to all 167 bathrooms (day 2, 3.17). Mr Whitaker was of opinion that the completion of the bedrooms, including the linked bathrooms, was a critical activity (No 7/156 of process, paragraph 2.12), and it is easy to see why that was so; in a hotel the proper fitting out of the bedrooms is clearly critical to completion. The final fix work in the bathrooms, excluding snagging, was completed on 10 March 1999 (Clerk of Works' diary, No 6/19 of process). Mr Whitaker considered that a further two weeks was required to complete the snagging (No 7/8 of process, page 27). I accept Mr Whitaker's evidence on this matter, and on that basis I consider that the defenders were delayed until approximately 25 March 1999. I consider that that delay was caused by the late instruction. In this case, I consider that the delay in completion was caused by the lateness of the instruction rather than its content. That was in accordance with the evidence of Mr Cornish (day 3, 3.05) and Mr Whitaker (No 7/8 of process, paragraph 2.70; day 12, 10.18).

Pursuers' criticism of defenders' case on instructions following Keppie's appointment

[93] At this point it is convenient to deal with certain general criticisms made by the pursuers of the defenders' arguments relating to instructions given following the replacement of RMJM by Keppie. These related in particular to the delay analyses set out by Mr Whitaker in his second report (No 7/8 of process). First, Mr Lowe criticized the type of delay analysis carried out by Mr Whitaker as a "theoretical exercise" (in his report No 6/351 of process, and in evidence: day 22, 2.35). Mr Whitaker had stated in evidence that he had carried out a small version of a critical path analysis in respect of each activity; these were contained in the tables in his second report. The pursuers submitted, however, that no practical analysis had been carried out by Mr Whitaker. The en suites were taken as an example: Mr Whitaker's analysis started from the premise that the reasonable time for issue of the instruction had to be measured against a Completion Date of 25 January 1999. He proceeded to calculate the delay period by reference to that date, and on the assumption that certain necessary elements of the work happened after that date. Thereafter he worked on the basis that the whole of the delay in issuing the instruction would necessarily produce an equivalent delay in completion. Thus, in the case of the en suite fittings, the delay in issuing the instruction is shown as 59 days and it is assumed that that automatically delayed completion after 25 January 1999 by the same number of days, giving a date of 25 March. No analysis was carried out to establish whether that was in fact correct. In this respect, it was assumed that there was no other work to be done; it was only on that basis that it could be assumed that the delay to completion corresponded to the delay in issuing the instruction. That was not warranted by the facts, however, in that various causes of delay were operating together.

[94] I do not think that this criticism is well founded. The method used by Mr Whitaker was as follows (day 11, 3.36 onwards). He first established a chronology, based on what actually happened on site in respect of each of the enumerated items. He then calculated the time that was reasonably required for delivery, installation and snagging. In part this calculation was based on what actually happened, and in part was based on Mr Whitaker's judgment as to what was reasonable for any particular aspect of the work. I was satisfied that he had great experience of programming in the construction industry and that his estimates of the periods required for particular items of work were reasonable. Once Mr Whitaker had calculated the period required for delivery, installation and snagging he worked backwards from the contractual completion date (25 January 1999) to determine the latest reasonable date for issue of the relevant instruction. On that basis he was able to calculate the delay in issuing the instruction. He then assumed that the delay to completion caused by the lateness of the instruction would be the same as the delay in issuing the instruction. That seems to me to be reasonable in relation to the particular item of work that is involved. This of course assumes that no other causes of delay were operative. There were in fact a substantial number of other causes of delay, and to that extent the pursuers' criticism has some foundation. Nevertheless, this simply means that delay was caused by a number of concurrent causes. These must in my opinion be dealt with in the manner discussed above, in particular at paragraphs [17]-[19]. The result is that any extension will be granted not on the basis of the delay in any individual case but on the basis of the whole of the causes of delay that are operative in the period following the contractual completion date.

[95] The pursuers' second criticism of Mr Whitaker's approach was that, in his delay tables, he used "guesstimates" for the duration of, for example, order, delivery and installation. In fact it is clear from Mr Whitaker's tables that he did take account of what actually happened in determining the duration of any particular activity. Thus, in relation to the fix items in the en suites, he based his analysis on the issue of the relevant instruction on 22 January, the start of installation on 11 February and the end of the installation period on 10 March. All of these were actual dates, a point that was accepted by Mr Lowe in cross-examination (day 26, 10.50). This point applies generally to all of the final fix items. In some cases Mr Whitaker had to estimate the duration of one part of an activity, for example (in the case of the en suite fittings) snagging and the necessary period for ordering the fittings. As indicated in the last paragraph, however, I am satisfied that Mr Whitaker's estimates were reasonable; they were based on his experience in the construction industry, and none of them appeared to me to be exaggerated. The pursuers' third

criticism of Mr Whitaker was that he had made excessive allowances for snagging. In relation to the en suite fittings, the pursuers submitted, on the basis of Mr Lowe's evidence (day 22, 2.57) that the contractor should tidy up when he finished working in an area. That was not snagging; snagging involved in dealing with items of work that had been done incorrectly. This difference is, I suspect, more semantic than real. As work proceeds on a task such as installing bathroom fittings, it is obvious that some untidiness will result; it also seems to me to be very likely that some items may not be properly installed, or that tiles or woodwork may be damaged. All of these matters would require to be dealt with, on a room-by-room basis. That is what I understand snagging to amount to. Given the number of rooms involved, I did not find Mr Whitaker's estimates (14 days for fittings in 167 bathrooms) excessive. The pursuers' fourth criticism of Mr Whitaker's approach was that he had not endeavoured to demonstrate that any of the listed items were on the critical path. On the basis of Mr Lowe's evidence, the pursuers submitted that they were not. I have already indicated that I am unable to rely on Mr Lowe's exercise in determining the critical path, at least in the later stages of the contract. In a sense, as a contract nears completion, more items will fall on the critical path because practical completion is impossible until they have been completed. This culminates in the last item to be completed which is, of necessity, on the critical path. In relation to the various items of work that Mr Whitaker thought caused delay to completion as a result of late instructions following the appointment of Keppie, I am satisfied that each of them was on the critical path, in the sense that the work was necessary before a hotel could be said to have achieved practical completion.

[96] Fifthly, the pursuers criticized Mr Whitaker's analysis because he had made use of the original completion date of 25 January 1999. In the first place, by the time when the relevant instructions were given, the defenders were already working on a 57-week programme; consequently actual progress on site could not be reflected in the original completion date. In the second place, by using the original completion date, Mr Whitaker had prevented himself from analyzing the progress that the contractor was making in relation to the 57-week programme. In the third place, there was no logic in measuring delay against the original completion date when the contractor was already in delay at a date when the instruction was issued. On this basis it was said that the lateness or otherwise of an instruction can only be assessed against the actual progress of the works at the relevant time, not against the current contractual completion date. I do not think that this criticism is well founded. It is true that Mr Whitaker's analysis was based on a completion date of 25 January, but that was the current contractual completion date. Consequently, in calculating the delay that was caused by any particular late instruction, the starting point had to be the original completion date. The reason, discussed more fully at paragraph [23] above, is that that was the date by which the defenders were contractually obliged to complete the works; in terms of clause 5.4 of the Conditions of Contract it is envisaged that information will be provided by the architect in such a way as to enable completion in accordance with the contractual Conditions. Those Conditions include the obligation, in clause 23, to complete by the completion date. The 57-week programme was, for this purpose, an internal document of the defenders. It obviously reflected delays that have already occurred in the project. The architect, however, had retained the original completion date, despite applications for an extension of time under clause 25. In my opinion the pursuers must accept the consequences of that decision. It is true that various other causes of delay were operating at the same time as the delay caused by the late instruction relating to the bathroom fittings, and the analysis carried out by Mr Whitaker in relation to the bathroom fittings does not take account of these. In my opinion that is the correct procedure. The delays caused by the individual late instructions must first be analyzed, and an estimate formed of the length of the delay caused by each such instruction. It is only then that the Architect, or the court, can proceed to the second stage of estimating the relative significance of the various causes of delay. Those must of course be taken into account as concurrent causes of delay.

[97] Finally, the pursuers submitted that the defenders had sought to categorize the various events following the appointment of Keppie as late instructions. The evidence was not to that effect, however; each of these heads of claim amounted to additional work and thus a variation. In my opinion there is no incompatibility between a late instruction and a variation. A particular instruction may amount to a variation, but it may still be late; that seems elementary. Thus I do not think that the defenders' approach to the items instructed following Keppie's appointment is erroneous on this ground. Indeed, once it became clear that further instructions were likely to be given regarding final fix items in the bedrooms and en suites, Mr Cornish produced the schedule referred to in paragraph [88] above; this was discussed at the site meeting of 7 October 1998, and was designed to ensure that timeous instructions were given in respect of all of those items. Following the issuing of that document, I am of opinion that the provisions of clause 25 relating to late instructions were applicable.

[98] Mr Lowe also gave evidence on the effect of the instruction relating to the en suite fittings. He criticized Mr Whitaker's allowance of 14 days for snagging, on the basis that most of what Mr Whitaker described as snagging was merely tidying up. I reject this criticism, for the reasons stated above; it seems to me that the difference is largely semantic, and that some time would be required to ensure that the rooms were in good order following the completion of the installation of the final fix items. Mr Lowe further concluded that this item of work did not fall on the critical path and thus did not delay completion. In my opinion the lateness of the instruction inevitably meant that the completion of this item would fall after the contractual completion date. I am further opinion that this item was critical, in the sense that properly fitted out bathrooms were essential for practical completion of the hotel.

2. Bedhead lighting

[99] Originally bedhead lighting was not part of the Works. At the site meeting held on 7 October 1998, Mr Cornish raised the issue of various bedroom fittings; these were mentioned in the schedule produced at the meeting (No 7/46 of process, page 13). One of the items mentioned was "Wall lights". Against this entry appeared the words

"Free issue to Browns?" Mr Cornish stated in evidence (day 3, 3.40 that this was a reference to bedhead lighting. As with the bathroom fittings, Mr Cornish explained that he was anxious to clarify responsibility for supply and installation in order to plan the installation programme (day 3, 3.40). Mr Cornish mentioned the bedhead lights in his letter to RMJM of 30 November (No 7/47 of process). On 3 December 1998 (No 7/48 of process) he wrote to the pursuers enclosing correspondence relating to client supply items, and asked about the delivery situation in order that the defenders might be informed. At this point it was assumed that the pursuers would supply the lighting for installation by the defenders. On 16 December 1998 Mr Cornish sent a fax to Keppie in which he referred to previous correspondence with RMJM and, in relation to inter alia the bedhead lights, stated

"These are items that cannot be deferred any longer. Electrically, we cannot of course complete bedrooms without bedhead lights. (Work commences 11/1/99). Please instruct accordingly".

The defenders received an Architect's Instruction in relation to the bedhead lighting on 24 December 1999 (noted in No 7/55 of process; dealt with by Mr Cornish, day 3, 3.42). The instruction was to supply and install the lighting. Events thereafter are set out in the defenders' letter to Keppie dated 8 March 1999 (No 7/55 or 7/157 of process); as indicated above in relation to the bathroom fittings, I am satisfied that this letter contains a substantially accurate account of events (on the basis of the evidence of Mr Cornish; day 3, 3.46):

"The bedhead lights were not part of our contract. However, since the bedhead lights are hard wired it is not possible to bring power into the rooms until the bedhead lights are fitted, nor is it possible to test and commission the electrical services.

On 24th November 1998 we wrote to RMJM asking for the bedhead lights to be issued to us. On November 1998 we wrote to RMJM once again on this subject. Finally we wrote to yourselves on 16th December 1998 requesting that the bedhead lights were issued to us in order to commence work on 11th January 1999.

We then received your instruction to supply and fix the bedhead lights on 24th December 1998. Our purchasing department had already closed for the Christmas shutdown and consequently an order for the lights could not be placed until 4th January 1999 at the very earliest.

In site meeting No. 12 (6th January 1999), minute 3.5, Keppie state that the bedhead lights supplier could deliver approx. 50% of the fittings by 20th January 1999 with the balance by 5th February 1999 on early receipt of an order.

SCL placed an order for the items on 6th January 1999.

Deliveries were not made in accordance with the date quoted by Keppie. Actual deliveries were received as follows:

36 No. 26th January 1999

304 No. 2nd February 1999

The further delaying factor was that:-

a. 36No. were delivered 6 days later than the dates quoted.

b. 134No. were delivered 13 days later than the dates quoted.

c. 170No. were delivered in accordance with the quoted dates".

The Clerk of Works' report for the week ending 14 February 1999 refers to electrical connection work to the bedroom furniture at fifth floor level; this included the bedhead lighting. The Clerk of Works' diary records electrical connections' being made to the bedroom furniture on 19 February 1999. The Information Required Schedule (No 7/114 of process) dated 26 January 1998, in the section headed "Electrical", stated that the date when information was required was May 1998. In the same document, in the section headed "Finishes", which might be construed as referring to the bedhead lighting, it was indicated that information was required by 10 August 1998.

[100] Mr Whitaker dealt with the bedhead lights in his report (No 7/8 of process) at paragraphs 2.71-2.73, with a table summarizing his position on page 7/8/29. His conclusion was that Keppie issued their instruction to the defenders to supply the bedhead lights 23 calendar days later than was required for them to be able to complete the work by the then completion date of 25 January 1998. On that basis the completion of the Works was delayed until 17 February 1999; this was caused by the lateness of instruction alone. Mr Whitaker considered that a reasonable date for the contractor to have received the instruction was 2 December 1998; that would allow a reasonable period to order the lighting, install it and complete snagging (day 12, 10.47). In reaching this conclusion he took into account the Christmas break. On this occasion he described what followed in some detail. That seems to me to indicate that the exercise that Mr Whitaker performed was not theoretical. Mr Whitaker stated that he had followed in the same principles in all of the exercises relating to items instructed by Keppie. He had discovered the actual delivery and installation periods, when that was possible. He had made allowance for a reasonable period for snagging and cleaning. He had taken care to ensure that the exercise was conservative in nature; it was based on his experience in the construction industry. He disagreed with the description "guesstimate" applied to his exercises; he considered them to be carefully assessed estimates. I found Mr Whitaker's evidence convincing on this matter, and I consider that his method was one that was entirely reasonable and was carried out on a responsible basis. For the avoidance of doubt, I should indicate that the same conclusion relates to the other estimates of delay carried out by Mr Whitaker in relation to instructions issued by Keppie. The evidence of Mr Cornish on delays relating to bedhead lights was to similar effect as Mr Whitaker's evidence; he thought that a reasonable date for the receipt of an instruction would have been about the beginning of December 1998 (day 3, 3.53).

[101] Mr Lowe accepted in cross-examination that the instruction relating to bedhead lighting was issued late (day 26, 12.09). He was not re-examined on that matter. He did, however, state that the late instruction did not cause any delay to completion, on the basis that this lighting did not fall on the critical path. In my opinion this item was critical,

in the sense that the proper fitting out of the bedrooms was necessary before practical completion could be said to have taken place.

[102] In my opinion a written request for an Architect's Instruction was made in the schedule produced at the site meeting held on 7 October 1998. It was not suggested that that application was made on a date unreasonably distant from our unreasonably close to the date when it was necessary to receive the relevant instruction. In those circumstances I am of opinion that the defenders made a written request for the relevant instruction, as required by clause 25.4.6. I accept the evidence of Mr Whitaker that the instruction should have been issued on or about 2 December 1998. On that basis I consider that the relevant instruction was not issued "in due time" for the purposes of clause 25.4.6; there was accordingly a Relevant Event within the meaning of that clause. Mr Whitaker stated in his initial report (No 7/156 of process, paragraph 2.12) that the fitting out of the bedrooms was a critical activity; that included the bedhead lighting work (day 10, 12.20). Mr Cornish supported that view (day 2, 11.57, day 3, 3.35). It seems to me to be clear that the commissioning of the electrical work would not be possible without the installation of the full lighting systems in the bedrooms; I accordingly have no difficulty in accepting that this item of work was critical. I therefore conclude that the delay in completing the installation of the bedhead lights caused completion of the Works to be delayed beyond the Completion Date. Mr Whitaker suggested that work was delayed until 17 February 1999. The Clerk of Works' diary records that work continued on the bedhead lights until 19 February 1999. That entry indicates that the delay in completion was two days longer than indicated by Mr Whitaker. In my opinion I must conclude that the work was delayed until the latter date, 19 February. I further conclude that the delay was caused by the lateness of the instruction rather than its content. Mr Cornish stated that the work content of the instruction was not large in itself, but that the lateness of the instruction caused difficulty (day 3, 3.56). Mr Whitaker agreed (day 12, 10.56).

3. Trouser presses

[103] The supply and installation of trouser presses was not part of the original contract. At the time of site meeting No 9, which was held on 7 October 1998, Mr Cornish asked about client supply items. In the schedule produced for the purposes of the meeting trouser presses were one of the items specifically raised (No 7/46 of process, page 13). The comment adjacent to this is "Install w/c 07/12/98?". At site meeting No 10, held on 4 November 1998 RMJM stated that the pursuers would provide free issue trouser presses to have them installed within the contract (No 7/42 of process, paragraph 06-3.1.1). On 30 November 1998 the defenders wrote to RMJM (No 7/47 of process) to state that verification was required from the pursuers on client supply items to be brought to site before Practical Completion. Mr Cornish indicated that it was important for the defenders to know exactly what was happening because of their intention to paint and snag the building on a floor by the floor basis; consequently they wanted the trouser presses to be delivered in instalments (day 4, 10.54). Following their appointment, Keppie wrote to the pursuers on 3 December 1998 to seek clarification on client supply items (No 7/48 of process). On 6 January 1999 the defenders received a verbal instruction to fit the trouser presses; this is recorded in the defenders' letter to Keppie dated 8 March 1999 (No 7/55 of process). On the basis of the evidence of Mr Cornish, I accept that that letter is an accurate summary of what happened thereafter. The letter is as follows:

"The trouser presses were not part of our contract. However, they are wired in and then covered with a duct from the furniture case goods manufacturer. Consequently, the trouser presses are required in order to finish the furniture installation, power up the rooms and test and commission the electrical works.

On 23rd November 1998 it became apparent that our domestic furniture manufacturer (A. Thomson) had received direct instructions from the interior designer (Thompson MacLeod) to manufacture cable tidy boxes. Consequently SCL were unaware of the size or fixing arrangements of this cable tidy until it was delivered to site.

Our letter dated 30th November to RMJM confirms that trouser presses need to be delivered floor by floor to our programme.

The programme was confirmed to the client via our fax dated 3rd December 1998. The first delivery was due during week commencing 11th January 1999 with further deliveries at weekly intervals.

On 6th January 1999 the Architect issued a verbal instruction to fit trouser presses.

On 22nd January 1999 we received 100No. Trouser presses i.e. 7 days later than required.

A sample trouser press was fitted in the mock-up room and the following problems were identified:

a. Cable tidy boxes incorrectly sized.

b. Setting out of trouser press position seemed incorrect and required clarification.

c. Trouser presses were plug in type not hard wired as the client required (the specification was correctly installed with single gang sockets).

These problems were witnessed by Janet Matthews [an operations manager for the pursuers] and communicated to Keppie Architects by fax dated 24th January 1999 [No 7/58 of process].

On 3rd February 1999 verbal instructions [confirmed at No 7/59 of process] were issued by Keppie Architects as follows:

a. Fit cable tidy box and decorate.

b. Setting out position clarified.

c. Remove of all single gang plugs and replace with fused spurs.

The further delaying factor was that trouser press installation started on 4th February 1999, i.e. 20 days later than Shepherd's requirements.

Further to fitting the trouser presses we wrote to yourselves on 16th February 1999. The trouser presses can not be wired up in accordance with the revised requirements since the skirting trunking is already full of cables. Our letter asks for further directions, however, at the time of writing these have not been received and this work is 'on-stop'. Until instructions are issued fixing of the trouser presses cannot be completed".

The evidence did not disclose precisely when fitting of the trouser presses was completed, but it is clear from the letter that this had not occurred by 8 March 1999. Moreover, in a letter to Keppie dated 11 March 1999 (No 7/150 of process) the defenders stated that no instruction had been received from the architect to resolve the question of the wiring of trouser presses; this related in particular to the question of whether they should be hard wired or fitted in such a way that they plugged into a socket. In that letter the defenders indicated that the work would be completed by 29 March 1999 if the information were made available by 15 March. Despite that, the minutes of the handover meeting held on 29 March 1999 (No 7/61 of process, page 5) record that hardwiring details were still awaited from Blyth & Blyth.

[104] Mr Whitaker dealt with trouser presses in his second report (No 7/8 of process) at paragraphs 2.78-2.87, and in a table found on page 32. His opinion was that a reasonable date for an instruction relating to trouser presses would have been 5 December 1998. This was 33 days before the actual instruction relating to the trouser presses; a verbal instruction was issued on 6 January 1999. On that basis Mr Whitaker concluded that the delay to completion of the Works was 33 days as a result of the late issue of instructions; in his report he stated that this excluded any effect of the work content involved. Mr Cornish thought that the instruction should have been issued by the end of November 1998 (day 4, 11.20). In the Information Required Schedule of 26 January 1998 (No 7/14 of process), information relating to furniture, which formed part of "finishes", is required by 10 August 1998.

[105] In my opinion a written request for information relating to trouser presses was made in the schedule produced by Mr Cornish at site meeting No 9, held on 7 October 1998, and indeed in the Information Required Schedule of 26 January 1998. It was not suggested that this application was made on a date unreasonably close to or unreasonably distant from the date when the information was required. I am accordingly of opinion that the defenders made a written request for the appropriate instruction in accordance with clause 25.4.6. I accept the evidence of Mr Whitaker that an Architect's Instruction should have been issued in early December 1998. I therefore consider that the relevant instruction was not issued "in due time" for the purposes of clause 25.4.6, and that there was accordingly a Relevant Event within the meaning of that clause. In relation to the criticality of this item, Mr Cornish stated that the installation of the trouser presses affected the defenders' ability to complete the fitting out of the bedrooms; electricians, carpenters and decorators all had to carry out work in relation to the fitting of the trouser presses. In addition a separate commissioning exercise was required (day 4, 11.09 onwards). Mr Whitaker stated (in his report No 7/156 of process, and paragraph 2.12) that the bedroom fit out activity was critical. In my opinion that is clear. Mr Whitaker further expressed the opinion (in his second report) that as a result of the late instruction regarding trouser presses the completion of the Works was delayed until 27 February 1999. In evidence he explained that in reaching this conclusion he had not taken account of the difficulties with hard wiring the trouser presses; consequently it might be appropriate to regard the delay as extending until the middle of March 1999 (day 12, 12.07); the delay would then be 47 days, not 33, and the last date in his table at page 32 of his report should be 13 March 1999. On the foregoing basis I am of opinion that the delay caused by the late instruction of the trouser presses should be regarded as continuing until 13 March 1999. Counsel for the defenders submitted that, because work relative to the trouser presses continued until at least 29 March, it would be appropriate to use that a date as marking the end of the delay. That is, however, contrary to the evidence of Mr Whitaker, and I think that I must confine myself to that evidence. I accordingly consider that 13 March is the appropriate date. I am further satisfied that this delay was caused by the lateness of the instruction rather than its content. That accords with the evidence of Mr Cornish, which was that the work content was not significant (day 3, 11.22; see also his project manager's summary for the site meeting of 3 February 1999 at item 4). Mr Whitaker was of the same view (day 12, 12.14).

[106] Mr Lowe gave evidence that the problems with the trouser presses related to the system of wiring. He thought that Keppie had dealt with that problem as quickly as possible (day 26, 12.36 onwards). In addition, Mr Lowe expressed the view that the instruction in relation to the trouser presses was issued in good time having regard to the contractor's actual progress on site (in his report, No 6/351 of process, page 16). In cross-examination (day 26, 12.39) Mr Lowe reiterated that the instruction was not late; although the issue had been raised by the defenders at the site meeting of 7 October, he thought that that was only in the context of a "delivery situation". In my opinion that is not the correct analysis of the matter raised at that site meeting; while the trouser presses were raised as a client supply item, Mr Cornish made it clear that he wanted the precise responsibilities in respect of such items to be determined as a matter of urgency. The schedule produced by the defenders at that meeting includes the comment *"Install w/c 07/12/98?"; this tends to indicate that installation was discussed. In any event, paragraph 3.1.5 of the minute (No 7/46 of process) indicates that the defenders wanted "to ensure the responsibility for supply and installation is clear and to plan the installation programme*". It is also stated that installation for each item needed to be confirmed by the pursuers, the defenders' aim being to avoid damage to completed finishes. RMJM were to co-ordinate matters arising in respect of fixtures and fittings. In the light of that paragraph I consider that Mr Lowe's reasons for treating the issue at the meeting as being only "delivery" are ill-founded. I conclude that the issue of responsibility for fitting was raised at the meeting, and in the light of that matter, which was clearly important, I agree with Mr Whitaker that the instruction was late. I also prefer the evidence of Mr Cornish and Mr Whitaker to the effect

that the problems were more extensive than the system of wiring, and arose out of the late instruction relating to the supply and fixing of the trouser presses.

4. Central atrium beam encasement

[107] At site meeting No 10, held on 4 November 1998, the defenders tendered a monthly report which contained a list of outstanding information as at that date (No 7/42 of process, page 13). The seventh item included in that list was "Details of gantry to Central Atrium (if required)". That item related to a gantry across the atrium of the hotel to which window cleaning harnesses could be fixed, and the encasement of beams in the central atrium area with MDF boarding. The list of outstanding information indicated that all of the items mentioned were required as a matter of urgency, and not later than Friday 6 November 1998, to enable the defenders to assess the implications and effects on completion. RMJM did not provide any information, and the matter was discussed again at the meeting held on 2 December 1998; at paragraph 6.2 of the minutes (No 7/43 of process) it is noted that safe access for the purposes of atrium window cleaning was to be reviewed. The architect and the pursuers were identified as the parties responsible for progressing matters. On 15 December 1998 Mr Cornish sent a fax to Keppie relating to the central atrium gantries. With it he enclosed a sketch to indicate what he thought RMJM had had in mind. This indicated that the gantries were to be enclosed in 12 mm MDF boarding. On 29 December 1998 the defenders received a verbal instruction to proceed with the arrangement set out by Mr Cornish in that drawing (referred to at No 7/44 of process, page 14). That verbal instruction was subsequently confirmed by a written instruction dated 4 February 1999 (found at No 7/69 of process as item 7.3). A verbal instruction received on 20 January had indicated that the MDF boarding should be 22 mm thick (see No 7/45 of process, page 10). The system for supporting harnesses was procured and installed by the defenders, with the work being completed on 15 January 1991 (Clerk of Works' diary). The beam encasement work started on 27 January and was completed on 9 February (Clerk of Works' diary).

[108] Mr Whitaker expressed the opinion that a reasonable time for the issue of the instruction relating to the gantries would have been 25 November 1998 (report, No 7/8 of process, paragraphs 2.88-2.91, and table on page 34). This was based on his estimate of a reasonable period for placing an order and organizing the work and a reasonable period for delivery, installation and snagging. He concluded that the delay in issuing the necessary instruction was 35 days, and that that caused a delay of 35 days in completion, as a result of the lateness of the instruction. In my opinion a written request for information on the atrium gantries and beam encasement was made in the information required schedule produced at the site meeting on 4 November 1998. No suggestion was made that this was unreasonably early or unreasonably late. On that basis, the defenders made a written request for the appropriate instruction in accordance with clause 25.4.6. I accept Mr Whitaker's evidence that an architect's instruction should have been issued by 25 November 1998. Mr Cornish thought that the instruction should have been issued at the end of October or start of November. On this matter, however, I think that Mr Whitaker's evidence is preferable. On that basis, I conclude that the relevant instruction was not issued "in due time" for the purposes of clause 25.4.6; there was therefore a Relevant Event within the meaning of that clause.

[109] I am further of opinion that the issue of this instruction was critical for the completion of the project. Mr Cornish (day 4, 11.45) explained by the information was important. The atrium was six storeys high and a scaffold was required to reach every floor. Until all trades had completed work on the curtain wall, the scaffolding could not be removed. Until the scaffolding was removed, however, the defenders were unable to do the second and final fix work at low level in the entrance area; that would apply to joinery and decoration at that area. In addition, a quarry stone doorframe and revolving door had to be installed after the scaffolding had been removed. Consequently the atrium gantries and encasement had a critical effect on the ability to complete the entrance area of the hotel. Support for Mr Cornish's evidence on this matter is found in his project manager's report to the site meeting held on 3 February 1999 (No 6/17 of process). Mr Cornish further indicated that, following receipt of the instruction, there was a two-week lead-in period (day 3, 11.50). The fixing system for the harnesses was completed by 15 January, but the beam encasement work was not started until 27 January and was only completed on 9 February. That by itself indicates that delay was caused by the late instruction. I am satisfied that completion was delayed by the late instruction. Mr Whitaker's evidence was that that delay amounted to approximately five weeks from the completion date of 25 January 1999 (second report, paragraph 2.91 and table). I consider that to be a reasonable estimate, and on that basis I am of opinion that, when account is taken of the late instruction relating to the atrium gantries and beam encasement, the completion date should be extended until 1 March 1999. I consider that this was the result of the lateness of the instruction rather than its content. Mr Cornish gave evidence that it would have been relatively straightforward to perform the necessary work at an earlier stage (day 4, 11.53). Mr Whitaker thought that it should have been possible to cater for the work on the gantries without delaying overall progress (day 12, 2.40). I accept that evidence.

[110] The pursuers submitted that the work on the central atrium beam encasement was not critical; in particular, the Clerk of Works' diary disclosed that work was carried out at ground level on items such as the slab for the revolving doors, where work had largely been carried out before the scaffolding for the higher-level work was erected. In addition, the Clerk of Works' diary disclosed that a floor screed was laid in the atrium on 2 January, although it was removed on 6 and 7 January because it was not thought sufficiently durable. On 14 January work began on a slate floor, with protection being supplied as necessary. Consequently any delay in the floor related to deficiencies in the concrete screed rather than the scaffolding. Furthermore, the beam encasement was programmed on the defenders' 57-week programme (number 7/45 of process) to finish on 1 February. On that basis, evidence of Mr Cornish that proceeded on the basis of the original completion date of 25 January was, it was submitted, irrelevant. Mr Lowe

expressed the opinion that the instruction relating to the atrium gantries was issued in good time having regard to the contractor's actual progress on site (report, No 6/351, page 16). In my opinion the criticism of the defenders' case on this matter is not conclusive. The fact that work on the floor was able to proceed while the scaffolding was up is hardly surprising, since the scaffolding would have been close to the wall. It was the ability to finish the floor and to finish work on the doors that was critical. Moreover, I consider that it was necessary to use the original completion date as a reference point in determining whether there was delay; the fact that other delays existed (delays which were reflected in the 57-week programme) is taken into account to the treatment of concurrent causes.

5. Fibre optic lighting in bar and breakfast bar areas

[111] In the bar and breakfast bar areas of the hotel fibre optic lighting was to be provided. Mr Whitaker dealt with this matter in his second report (No 7/8 of process) at paragraphs 2.95-2.99, and in the accompanying table on page 36. He indicated that on Thursday 21 January 1999, two working days before the then Completion Date, Keppie sent the defenders a quotation from Carmichael Lighting Associates for the supply of the fibre optic lighting (produced with No 7/160 of process). In their covering letter Keppie informed the defenders that that quotation had been sent directly to the relevant subcontractor, Browns Electrical, on 1 December 1998. Mr Whitaker notes that that would seem to show that the architect had been in a position to instruct acceptance of the quotation seven weeks earlier. The letter of 21 January instructed the defenders to act on the quotation and to take delivery of the arrangement to suit both the bar and breakfast bar. Two quotations from Carmichael were attached to the letter, both dated 1 December 1998; one had been sent to Browns and the other to Thompson MacLeod, the pursuers' interior designers. These related only to fibre optic lighting in the bar area. Following the architect's letter of 21 January 1999, Mr Cornish sent a fax dated 24 January 1999 (No 7/58 of process); this asked for urgent action in relation to the fibre optic lighting. In the fax Mr Cornish mentioned that the defenders had acted on the instruction immediately and had instructed their shopfitter, Nash Fisher; Nash Fisher had yet to respond whether items could be retro-fitted in such a way as to maintain delivery dates. The delivery date for the breakfast bar was the week commencing 25 January; that for the main bar was the week commencing 1 February. Mr Cornish further pointed out that the instruction to Carmichael Lighting made no reference to any installation in the breakfast bar. The fax concluded "If you require fibre optic lighting to this bar please specify". In evidence Mr Cornish explained the reference to retro-fitting: Nash Fisher were making up the breakfast bar and the bar at their factory in Bristol, and the question was whether they could incorporate the wiring for the fibre optic lighting into the joinery before it was completed (day 4, 12.10). Keppie responded by letter dated 28 January 1999, with which they enclosed a revised quotation for the supply of fibre optic lighting from Carmichael Lighting associates; this included the breakfast bar. By that letter Keppie instructed the defenders to accept the quotation and install fibre optic lighting in both bar and breakfast bar. At the subsequent site meeting, on 3 February 1999, Mr Cornish reported that the bar and breakfast bar would not be fitted until 1 March, as procurement of the necessary items would take 3-4 weeks (No 7/45 of process, page 10).

[112] The evidence of Mr Cornish was that the defenders would have required to supply Nash Fisher with details of the fibre optic lighting two weeks before the bar and breakfast bar carcasses were due to be delivered to site; in addition, allowance would have to be made for the period necessary for procurement, but Mr Cornish did not know what that was (day 4, 12.15). In the minute of site meeting No 13 (No 7/45 of process, at page 10) it was indicated that the procurement period was 3-4 weeks. Mr Whitaker thought that the two-week period for the work and snagging was reasonable and that the procurement period had to be taken into account (day 12, 1.56). On that basis, a period of five to six weeks was required. Taken back from the Completion Date, that indicates an Architect's Instruction at the beginning of December 1998. In my opinion that would have been a reasonable time for the relevant Instruction. That was, of course, very close to the point where Keppie were instructed in place of RMJM, and that may explain why no Instruction was issued at that time. An application in writing had in my opinion been made, in the form of the Information Required Schedule dated 26 January 1998 (No 7/114 of process); in this all information relating to electrical work was to be produced by 4 May 1998. That was in my opinion sufficient to satisfy the requirements of clause 25.4.6. There was no suggestion that this application was made unreasonably early or unreasonably late.

[113] On the foregoing basis, I consider that the failure to issue the relevant Architect's Instruction in time to allow the installation of the fibre optic lighting prior to the completion date would constitute a Relevant Event for the purposes of clause 25.4.6. The revised Instruction was in fact issued on 28 January 1999, after the completion date. I am further of opinion that the failure to give the instruction in time was critical to completion; the evidence of Mr Cornish was that the lighting had to be incorporated by Nash Fisher into their joinery carcasses, which were then delivered to site and installed there. Mr Cornish stated that a lot of services had to be fitted in the bar area is once the joinery carcasses had been installed; consequently the delay affected the defenders' ability to finish the work. In addition, the installation of the bars was essential to complete elements of the floor finishes, and security shutters had to be placed on the bar once it was installed (day 4, 12.10 onwards). I accept Mr Cornish's evidence on these matters; it accords with obvious common sense. The result is that I consider that the Relevant Event delayed completion of the Works beyond the completion date.

[114] The bar and breakfast bar had not been fitted at the time of the site meeting held on 3 February 1999; at that time Mr Cornish reported that fitting would not take place until 1 March (No 7/45 of process, page 10). Neither expert witness was clear as to when the bar and breakfast bar were in fact fitted. The last item of work relating to the fibre optic lighting was instructed on 18 March 1999 (AI 137). This was a minor adjustment to the lighting, which indicates that the lighting had been installed by that time. Mr Whitaker (day 12, 1.54 onwards) estimated that the

result of the delay in instruction was that the period for completion should be extended to 15 March 1999. The basis for this conclusion was that Mr Cornish had indicated at the site meeting on 3 February that the bar and breakfast bar would not be fitted until 1 March; in addition, Mr Whitaker thought that an allowance had to be made for associated work and snagging, and he allowed two weeks for that. I accept Mr Whitaker's evidence on this matter. I accordingly conclude that the time for completion should be extended as a result of the late instruction relating to the fibre optic lighting until 15 March 1999. I am further of opinion that the delay was caused by the lateness of the instruction rather than its contents. Mr Cornish indicated (day 4, 12.22) that it would not take long to incorporate the lights into the joinery, and Mr Whitaker reached a similar conclusion (No 7/8 of process, paragraph 2.99).

[115] In this case the pursuers repeated the general criticisms that applied to all of the final fix items. Mr Lowe expressed the opinion that the instruction was issued in good time having regard to actual progress. In my opinion the general criticisms are not well founded in this case, and I prefer the evidence of Mr Whitaker to that of Mr Lowe regarding the timing of the instruction.

6. External mounted floodlights

[116] Floodlights were to be mounted on the outside of the building at plant (sixth floor) level. The work involved is dealt with by Mr Whitaker in his second report (No 7/8 of process, paragraphs 2.104-2.111, and table on page 39). At site meeting No 12, held on 6 January 1999, the Clark of Works suggested that the lights to be installed were too weighty, and it was requested that it should be confirmed that the specification was correct for the location (No 7/44 of process, M & E Services Information Required Schedule, at page 21). Mr Cornish indicated that the external floodlights were fairly heavy pieces of electrical equipment, which were due to be fixed to the cladding at sixth floor level; this was lightweight metal panelling, and the concern was that it would not support the floodlights adequately (day 4, 12.48). On 11 January 1999 the defenders sent Keppie a fax enclosing a proposed detail for the fixing of the floodlights (No 7/78 of process). In their letter to Keppie dated 25 January 1999 (No 7/52 of process) the defenders stated that an instruction requiring the floodlights was required urgently. The minutes of the next site meeting, held on 3 February 1991 (No 7/45 of process) indicate at paragraph 4.1.2 that the locations of floodlights had been considered and that these should now be fixed through the frieze level panels and louvres. In his report to the meeting (page 11) Mr Cornish indicated that no Architect's Instruction had yet been received, and that on the defenders' current knowledge installation would take 4-6 weeks from the time of the instruction; therefore cherry pickers would be on site well into March 1999. The Information Required Schedule produced at that meeting further indicated (item 2) that instructions were required from Blyth & Blyth. An instruction seems then to have been given; on 22 February 1999 the defenders sent a fax to Zonner ordering 22 lighting brackets (No 7/79 of process). These required to be powder coated by a specialist, in order that they would match the colour of the cladding. The Clerk of Works' report dated 15 March 1999 records that fixing of the floodlights had begun during the previous week. When the handover meeting took place on 29 March 1999 the floodlights were excluded from the handover (No 7/61 of process). The Clerk of Works' diary indicates that the connection of the floodlights was completed on 31 March. On the foregoing basis, Mr Whitaker concluded that the defenders were delayed until 22 March 1999 in completing the Works on account of the lateness of the instruction to modify the fixing of the floodlights at high level.

[117] Mr Whitaker's evidence was that a reasonable time for issuing an instruction relating to the high-level lighting was 9 December 1998; he thought that the problem should have been identified by the design team before it was noticed by the Clerk of Works (second report, page 39; day 12, 2.18). Mr Cornish thought that the instruction should have been issued even earlier (day 5, 10.45). The relevant Instruction was in fact issued on 3 February 1999. In my opinion it is clear that the instruction was not issued timeously; it was in fact produced after the completion date. It seems to me to be clear that the design team should have considered the light fixings in good time to allow their installation prior to the completion date. In addition, it is clear that there was a lead-in time for the form of fixing ultimately used; that is hardly surprising. An application in writing was made for information in respect of floodlights in the Information Required Schedule produced at the site meeting held on 6 January 1999. It was not suggested that this was unreasonably early or unreasonably late. In my opinion the necessary architect's instruction should have been issued shortly thereafter to allow the installation of the floodlights to proceed as rapidly as possible. I consider that the instruction should have been issued by the Monday following the site inspection of 6 January, that is to say by 11 January. I accordingly conclude that the late issue of the relevant information was a Relevant Event, and that it caused the completion of the Works to be delayed beyond the completion date. The effect on the Works was spoken to by Mr Cornish (day 5, 10.48); he stated that the result of the delay was that the floodlights themselves could not be completed and commissioned; in addition, the use of cherry pickers late in the construction programme affected work at ground level, including landscaping and the surfacing of parking and access areas. Mr Whitaker's opinion (No 7/8 of process, page 39) was that the defenders were delayed by the late instruction until 22 March 1999. Work in fact continued on the floodlights until 31 March, and they were excluded from the handover on 29 March. There was no suggestion that work on the floodlights had proceeded unduly slowly. In these circumstances I think that the inevitable conclusion is that the late instruction delayed completion until 31 March. Both Mr Cornish and Mr Whitaker thought that the work content of the instruction regarding the fixings for the floodlights was not major, and that it was the lateness of the instruction that caused delay (Mr Cornish on day 5, 10.49; Mr Whitaker on day 12 at 2.21). On the basis of their evidence I agree with that conclusion.

[118] The pursuers criticized the evidence of Mr Cornish and Mr Whitaker in that they both suggested that instructions should have been issued by the architect before the problem was noticed by the Clerk of Works. Mr Whitaker's evidence, at least, was that the problem should have been identified by the design team before it was noticed by the Clerk of Works. Nevertheless, a Relevant Event under clause 25.4.6 cannot occur until a written application for

an instruction is made and that did not occur until 6 January. For this reason I reject the view of Mr Whitaker and Mr Cornish that the instruction should have been issued on 9 December or earlier; instead I consider 11 January to be the appropriate date. Mr Lowe gave evidence that the instruction in relation the external floodlights was issued in good time having regard to the contractor's actual progress on site. For the reasons discussed in the last paragraph I do not agree with that view. Counsel for the defenders drew attention to one further aspect of Mr Lowe's evidence in relation to the floodlights, and also the cooling system for the refuse room. In cross-examination (day 26, 2.42) Mr Lowe stated that the fixing of the floodlights did not affect practical completion because the floodlights were excluded from the handover. The same would apply to the stair balustrading (a matter discussed below where the defenders were in default). In re-examination (day 27, 2.19) Mr Lowe was asked whether practical completion could be achieved before the stair finishes and balustrades were completed on 12 April. He replied that these were in his opinion necessary for completion. On that basis 12 April would be the correct date for practical completion. Shortly afterwards (day 27, 2.26), Mr Lowe was asked about the position on 28 March, and in particular whether as at that date the completion of the Works had been delayed by the stair finishes and balustrades. Mr Lowe replied "Simplistically, yes". He was then asked whether the same was true of the louvres to the refuse room, and he replied "Yes. My answer applies to the other items". That indicates that Mr Lowe accepted that the major items of work that had not been completed by 29 March were causing delay as at that date. He accepted that this would apply to both the cooling system to the refuse room and the stair balustrades and finishes, but it would seem that the same point must apply to the floodlights.

7. Cooling system for the refuse room

[119] It was decided by the pursuers prior to site meeting No 10, held on 4 November 1998, that a cold room condenser should be installed in the hotel's refuse room. At paragraph 3.4.7 of the minutes of that meeting (No 7/42 of process) it was noted that RMJM had advised that chillers were to be provided in the refuse stores; an Instruction was to follow from RMJM. The significance of this matter is that it was necessary to provide cooling in the cold store room where food and other items were stored for use in the kitchen and restaurant. The condenser required for that cooling system was located within the refuse room. That could, however, cause heat to build up in the refuse room, which gave rise to a health and safety issue; consequently measures were required to deal with the heat. This matter was not controversial, and was spoken to by Mr Cornish (day 4, 2.14), Mr Whitaker (day 12, 2.37) and Mr Lowe (day 26, 3.07). Prior to the site meeting held on 6 January 1999, the defenders issued an Information Required Schedule in respect of M & E services. This recorded that the defenders required confirmation of the position of the cold room condenser, the routes of the necessary pipework and any builders work enclosure that was required (No 7/44 of process, page 20). The issue was discussed at the meeting, and at paragraph 7.5 of the minutes (No 7.44 of process) it is narrated that Blyth & Blyth and Keppie were to review the condenser requirements to the cold room and refuse store; a planning issue had arisen. The item was marked for action by those two firms. The planning issue arose because, as a result of the installation of the condenser, louvres would be required on the outside of the building (Mr Cornish, day four, 2.21). At this meeting (No 7/44 of process, paragraph 8.3) Mr Paul Toffolo of Keppie requested that the defenders act on directions from consultants; this would short-circuit the flow of information at the initial stage. All such directions would be followed up by the issue of an architect's instruction. The purpose of this was to get information produced by Blyth & Blyth quickly to the electrical and mechanical subcontractors, who had to act on that information. Mr Cornish indicated that that instruction was given because Mr Toffolo knew that instructions were already very late (day 3, 2.21). The defenders then sent Keppie a notice of delay under clause 25; this was in the form of a letter dated 25 January 1999 (No 7/52 of process) which referred to the cold water condensers as a source of delay, and it was noted that information was required from Keppie and Blyth & Blyth.

[120] At the next site meeting, held on 3 February 1999, Mr Cornish recorded in his project manager's summary (No 7/45, page 11, item 10) that the defenders had been instructed on 29 January to procure fans, louvres and an air conditioning unit, and to build an enclosure in the refuse room and carry out extensive builders work. Mr Cornish indicated in his report that there was little prospect that that work would be completed until mid or late March. The terms of the instruction of 29 January are found in No 6/129 of process as AI 131. At the site meeting of 3 February (minutes, paragraph 4.1.14) receipt of information for the condensers and ventilation to the refuse room was confirmed. It was noted that the subcontractor required electrical specification for the controls. It was further specified that the vent grille was to be full height to accommodate three openings, and was to be coloured to match the render. It was further noted (minutes, paragraph 5.2.5) that, according to the mechanical engineer, the fan coil arrangement to the refuse room was causing delay. The problem of heat in the refuse room required the enclosure of the condenser unit within partitioning inside the refuse room. It also required that extract and ventilation fans and grilles should be installed, along with a fan coil unit designed to contain chilled water within the refuse room itself, in order to keep the refuse room cool. The relevant instruction for this solution is found at AI 135, issued on 5 March 1999; this referred to an engineer's instruction of 2 March 1999. It was this Architect's Instruction that contained the information necessary for the construction of the chilling system by the electrical subcontractor (Mr Cornish, day 4, 2.36). Work on the chilling system was completed on 12 April 1999 (Mr Lowe's report, No 6/16 of process, appendix 3, item 81, paragraph 13).

[121] Mr Cornish gave evidence that the instruction relating to the chilling system in the refuse room should have been issued as part of the first fix mechanical works, by October 1998 (day 4, 2.42). Mr Whitaker considered that instruction should have been issued no later than the middle of November 1998; the matter had first been raised at the site meeting held on 4 November, and RMJM had stated that an instruction would follow (No 7/42 of process, page 4). In their original Information Required Schedule dated 26 January 1998 (No 7/114 of process) the

defenders had asked that information relating to electrical works should be issued by 4 May 1998 and information relating to mechanical works by 29 June 1998. A further written request for the information was found in the schedule produced at site meeting No 12 on 6 January 1999.

[122] Against the foregoing background, I am of opinion that the Architect's Instruction issued on 29 January 1999 was not issued "in due time" for the purposes of clause 25.4.6. I consider that a written application for an Instruction was made by means of the Information Required Schedule of 26 January 1998. The matter had been discussed at site meeting No 10, on 4 November 1998, when it was stated that an Instruction would follow; the request must be construed in the light of that meeting. In my opinion the application was neither unreasonably late nor unreasonably early; no suggestion to the contrary was made. The Instruction was not in fact issued until 29 January 1999, after the contractual completion date. Mr Whitaker gave evidence that the instruction was "obviously late" (day 12, 2.56). I think that that must be correct, in view of the timing of the earlier discussions, and also in view of the time that was in fact taken to install the cooling system. In these circumstances I consider that the late Instruction relating to the refuse store cooling system was a Relevant Event for the purposes of clause 25.4.6. I am further of opinion that the Relevant Event caused completion of the Works to be delayed beyond the Completion Date. In view of the fact that the Instruction was only issued on 29 January 1999, it is inevitable that delay would be caused to the Completion Date. In any event, the work involved was clearly relatively complicated; it involved the procurement of the necessary equipment and pipework. It was only completed on 12 April 1999, which tends to indicate the complexity of what was involved. Mr Cornish further explained (day 4, 2.52 onwards) that the instruction affected the ability to commission the mechanical systems at ground floor level. It further affected commissioning of the cold store room and made it necessary to recommission the electrical control systems. In these circumstances it seems clear that the lateness of the Instruction caused delay beyond the Completion Date. It also appears that the work was critical for the purposes of completion. It was essential that the cold store should be usable if the kitchen were to be brought into use, and that was clearly critical to the hotel restaurant (day 4, 2.43). Mr Lowe agreed that kitchen and storage areas were necessary for completion of the hotel (day 23, 3.07). Moreover the refuse room cooling was, along with the stair balustrading, one of the last two items to be completed; both were completed on 12 April 1999. Mr Lowe accepted that the last item to be completed is necessarily on the critical path (day 22, 3.14). Consequently the refuse room cooling must have been critical.

[123] As to the length of time that should be allowed by way of extension, Mr Whitaker's opinion (second report, paragraph 2.117) was that the defenders were delayed in completing the Works until 9 April 1999 as a result of the lateness of the instruction to provide cooling to the refuse store. Counsel for the defenders submitted that, since the refuse store cooling was only completed on 12 April 1999, that should be treated as the end of the delay caused by that part of the Works. There was no suggestion that the defenders or their subcontractors were particularly dilatory in this part of the works. Consequently I think that counsel was correct in his submission, and I find that the extension in respect of the refuse store cooling should be until 12 April 1999. Mr Whitaker's evidence was that it was the lateness of the instruction that caused delay, rather than its content. He stated that the effect of the instructed works was localised; thus it would have been possible to bring in further resources to work in that area without disruption to other trades and other work (day 12, 2.56). Mr Cornish was also of opinion that the defenders' delay was caused by the lateness rather than the content of the instruction. The instruction represented a fairly minor part of the works (day 4, 2.46). Thus 3 fan coils had to be installed in this area, but 170 fan coils were installed elsewhere. Larger chiller equipment had to be installed elsewhere in the building. On the basis of this evidence I am of opinion that it was the lateness rather than the content of the instruction that caused the delay.

[124] The pursuers submitted that Mr Cornish had not been able to indicate the effect that the works on the cooling system for the refuse room would have on overall progress of the works; moreover, he had given evidence that the content of these works was a fairly minor part of the works as a whole and did not affect work in the bedrooms. In my opinion the answer to this point is that these works occurred at the very end of the contract, and work was in fact continuing on 29 March when the handover meeting occurred. At that stage any work that is still outstanding, if it is essential for the usable occupation of the building, must necessarily be critical. That point was in effect accepted by Mr Lowe in the passages in his evidence discussed at paragraph [122] above; these apply equally to the cooling system for the refuse room. Moreover, in questioning by the court during evidence in chief, Mr Lowe accepted that the last item to be completed is, by definition, on the critical path (day 22, 3.14). That point can in my opinion be generalized; any work of significance that is still outstanding at handover must be on the critical path.

8. Trees

[125] On 13 November 1998 English Landscapes, the defenders' landscape subcontractors sent a fax to RMJM (No 7/159 of process) to state that trees of the variety that had been specified (Liriodendron tulipifera 'Aureomarginatum') were not available; English Landscapes suggested an alternative, namely the standard variety of that species, and requested further instructions. RMJM's appointment was terminated shortly thereafter. At site meeting No 12, held on 6 January 1999, it is recorded in the minutes that Keppie were to agree the landscaping consultancy requirements with the pursuers (No 7/44 of process, page 3, item 29). The matter was mentioned again at site meeting No 13, held on 3 February (No 7/45 of process, page 11, item 11). On 5 February 1999 the defenders became aware that a firm of landscape consultants, Derek Lovejoy and Partners, had been appointed (No 7/84 of process). A meeting took place that day attended by Lovejoy, English Landscapes, the defenders and Bristol City Council to discuss the matter. The local authority were involved because of the existence of a planning condition that the variety and size of trees had to be approved by the council. On 10 February Lovejoy wrote to the local authority to request approval of alternative trees. On 18 February the Architect instructed alternative trees. In

the Clerk of Works' diary it is recorded that the trees were on site ready to start planting on 1 March 1999 (No 7/85 of process). On 2 March the defenders wrote to Keppie (No 7/84 of process) to inform them, in accordance with clause 25, that the progress of the works was likely to be delayed in respect of landscaping. The cause of delay is set out in detail; in essence the complaint was that no information as to the variety of trees to be planted was provided until 18 February. It is agreed in the parties' joint minute that the landscaping element of the works was completed on 19 March 1999; that is in accordance with entries in the Clerk of Works' report for the week ending 21 March.

[126] Mr Whitaker (second report, paragraphs 2.118-2.121 and accompanying table) expressed the opinion that the defenders were delayed in completing the Works until 31 March 1999 as a consequence of the lateness of the instruction with regard to the alternative variety of tree to be planted. His view was that the instruction should have been issued no later than 16 December 1998 (table, and day 12, 3.02). Mr Cornish gave evidence that the instruction should have been issued on 1 December 1998, on the basis that the information had been requested in mid-November (day 4, 3.09). In my opinion it is clear that an application in writing for the necessary information was made by English Landscapes on 13 November 1998, and that that application satisfied the requirements of clause 25.4.6. There was no suggestion that the application was made unreasonably early or unreasonably late. In view of that application, I am of opinion that Mr Whitaker was fully justified in expressing the opinion that an Instruction should have been issued by the middle of December. On that basis I conclude that the instruction of 18 February 1999 was not issued "in due time" within the meaning of clause 25.4.6. It is likewise clear in my opinion that the lateness of the instruction caused the completion of the Works to the delayed beyond the Completion Date. The instruction itself was in fact issued more than three weeks after the then current Completion Date. The planting of the trees was clearly necessary to complete the landscaping work (Mr Cornish, day 4, 3.11). The landscaping works were part of the Works to be performed under the contract, and consequently the delay in landscaping caused delay in completion beyond the Completion Date. I am of opinion that completion of the Works was delayed until 19 March by the failure to provide a timeous instruction relating to the trees; that was the date when planting concluded. I am further of opinion that the delay was caused by the lateness of the instruction rather than its content. Indeed, the content of the work did not change in any way; all that happened was that one variety (Aureomarginatum) of the species was replaced by the standard form of the species.

[127] The pursuers submitted that much of the delay in planting the trees was the result of either weather conditions or default by the contractor or subcontractor. The Clerk of Works' diary (No 6/19 of process) indicated that on 8 March that it was too wet for planting and also, on 15 March, that the topsoil had not been cultivated to specification and was of poor quality. In fact the entry on 8 March notes that the soil was still too wet for planting but that the landscaping contractor was fixing trees that had already been planted. That suggests that work was progressing. I have been unable to find any entry relating to the landscaping work on 15 March. On 18 March it is narrated that the Clerk of Works went right through the landscaping scheme with the landscape architect. He agreed to write to the contractor regarding planting and the replacement of plants. The Clerk of Works then went through the scheme with the landscape subcontractor and agreed snags to be corrected. These entries do not suggest that bad weather was a serious problem; indeed, it appears from the Clerk of Works' diary that on the whole the weather during the first three weeks of March was fine, good or very good. The fact that snagging work had to be carried out is hardly surprising. In my opinion the pursuers' submission on this matter is without substance.

9. External render

[128] The exterior walls of the hotel at ground floor level were to be covered with render. In the defenders' Information Required Schedule produced for site meeting No 12 (No 7/44 of process, page 14) it is indicated that on 18 November 1998 the defenders had made an application for information in respect of the Andura coatings that had been specified by the architect, that information being required by 30 November. At the site meeting, which was held on 6 January 1999, Keppie agreed (paragraph 4.1, item 15) that, by 1 February, they would discuss and agree the texture of the render with the client and with the Planning Department of the local authority, and would review the base coat thickness and interface with the windows. Keppie and the pursuers were noted as being responsible for dealing with this issue. The reference to the interface with the windows was explained by Mr Whitaker (day 12, 3.16): the windows were manufactured to precise tolerances, but the tolerances used in the blockwork were less precise; consequently the difference between the two created a problem in achieving the required thickness of render. Doubts about this had been expressed by the defenders. On 27 January 1999 Keppie issued a verbal instruction that the defenders should use Andura Orchid Fine Textured TMC render; "Orchid" was the colour. That instruction was confirmed by the defenders in a fax to Keppie dated 30 January; Keppie responded to this by a letter dated 1 February. At site meeting No 13, held on 3 February, Mr Cornish reported in the Project Manager's Summary that, if a lot of cold or wet weather was experienced in February, that work would not be finished (No 7/45, page 11, item 12). He also indicated that graffiti paint had still not been instructed. Matters were taken further in a letter from the defenders to Keppie dated 10 February (No 7/89 of process) . In this letter the defenders pointed out a number of further issues that were preventing a start on the render. These were: first, the specification in the relevant Bill of Quantities did not correspond to the recommendations of the manufacturer of the render; secondly, the extent to which the specification required graffiti coating had not been confirmed; thirdly, the defenders had had difficulty in obtaining metal beading for placing round the windows to suit the specified thickness of the render; fourthly, confirmation was requested as to whether the main rendering works should be delayed until a sample panel, ordered on 4 February, had been approved; and fifthly, the interface between the rendering and the windows was to be reviewed by 1 February in accordance with the decision made at site meeting No 12. In evidence Mr Cornish stated that the defenders could not have started the external rendering until the

issues in that letter had been resolved (day 4, 2.27). Keppie replied to the letter in two stages. First, on 12 February (found in No 6/351 of process, at appendix 3/4) they advised the defenders of a supplier of appropriate beading. Secondly, on 15 February Keppie dealt with the other issues; they advised that the sample panel was only likely to be relevant to the colour, and that it would be acceptable to have a projection of the render of between 6 and 10 millimetres beyond the window face. The Clerk of Works recorded in his diary that the preparation for the start of rendering began on 8 March, and that the work was completed in the following week.

[129] Mr Whitaker was of opinion that the Architect's Instruction for the render should have been issued by 20 December 1998 (second report, paragraphs 2.1 to 2-2.128 and accompanying table). The evidence of Mr Cornish was that issues regarding the render should have been resolved by the end of November (day 4, 3.29). The defenders had requested the relevant information by 30 November, as is indicated in the Information Required Schedule presented at site meeting No 12. On that basis, I am of opinion that Mr Whitaker's date of 20 December is clearly justified. In these circumstances, I consider that the Architect's Instructions issued on 27 January and 15 February dealing with rendering were not issued "in due time" in terms of clause 25.4.6. The information in connection with the rendering had been requested by 30 November; moreover, in the original Information Required Schedule dated 26 January 1998 (No 7/114 of process) the defenders had requested full package information in relation to external rendering by 31 July 1998. It was not in dispute that the requests for an Instruction were made neither unreasonably early nor unreasonably late. I accordingly conclude that there was a Relevant Event within the meaning of clause 25.4.6, namely a late instruction relating to the external rendering.

[130] In my opinion that Relevant Event caused completion of the Works to be delayed beyond the Completion Date. Mr Cornish gave evidence that work on the rendering could not begin until the issues set out in the defenders' letter of 10 February were dealt with (day 4, 3.27). Moreover, the specification provided that the defenders should not start rendering work until the colour and texture of the render had been approved. Definitive instructions were not given until 15 February, which was three weeks after the Completion Date. It is obvious that the rendering had to be completed before the hotel could be said to be completed; indeed, the necessary scaffolding and other equipment would make it difficult to run the hotel while rendering work was proceeding. In his second report Mr Whitaker expressed the opinion (paragraph 2.128) that the defenders were delayed until 8 March 1999 (wrongly stated as 1998) as a result of the late issue of instructions regarding the rendering. I am content to accept that view, which I think was reasonable in all the circumstances. I am further of opinion that the delay was caused by the lateness of the instruction rather than its content. The work involved was basically the same as that originally specified; it involved the application of render to the walls at ground floor level. Moreover, it is clear from the Clerk of Works diary that the work did not take long; preparations began on 8 March and were concluded the following week.

[131] The pursuers submitted that the completion of the external render resulted from a series of contractor defaults relating to the eaves cladding and the interface between the windows and the blockwork. In this respect they relied on the evidence of Mr Lowe, who stated that the scaffolding on the outside of the building was not taken down in line with the programme because of difficulties encountered in the detailing of the eaves at roof level (report, No 6/351 of process, paragraph 2.128). Mr Lowe further stated that the scaffolding remained in place as a result of contractor default because the installation of the cladding to the underside of the roof overhang was not as detailed on the architect's sketch. Mr Cornish, however, gave evidence (day 7, 2.19) that the problem with the eaves arose because Kelsey, the subcontractor, had suggested that a colour strip should be used to cover the fixings on the eaves panelling; this was not accepted by the architect on visual grounds. It was then pointed out that the fixings could not be seen from the ground, and the architect then accepted the suggestion. This was the only evidence as to what actually occurred on site, and I cannot hold that it involved contractor default. The relevant architect's sketch was not produced, and there was no evidence of any material departure from the sketch. In addition, the dismantling of the scaffolding was completed on 4 February 1999, but the rendering work could not begin until the issues mentioned in Mr Cornish's letter of 10 February 1999 had been dealt with. In particular, a sample panel had to the approved, and that appears only to have occurred after 15 February. Mr Lowe further gave evidence that there had been contractor default in relation to the interface between the windows and the blockwork. He stated (day 22, 3.19) that the defenders should have started from the external face and worked back in to ensure a straight external face; in this way any discrepancies between the manufacturer tolerances for the windows and the tolerances for the blockwork could be eliminated by making adjustments to the position of the blockwork. Nevertheless, in cross-examination Mr Lowe accepted that the architect was obliged to provide accurately dimensioned drawings to enable the contractor to set out the works at ground level (day 27, 10.39), and that the contractor's obligation was to set out the works accurately in accordance with those drawings.. On that basis, I have difficulty in understanding how the contractor could make the sort of adjustments that Mr Lowe envisaged. Indeed, if a significant discrepancy arises between the tolerances for the blockwork and those for the windows, it is for the architect to determine how the two elements are to be integrated with each other; this appears from clause 2.4.4 of the Conditions. The defenders further relied on the evidence of Mr Lowe that the instruction in respect of the render was issued in good time having regard to actual progress on site, and was not on the critical path. In my opinion the instruction was late, as indicated in Mr Whitaker's evidence, and at the stage of the contract where the problems of the external render arose it is clear in my view that it was critical to completion.

Delay by defenders: lifts

[132] The pursuers contended that, even if the defenders were correct in asserting that Completion had been delayed by the various matters discussed above, it was also delayed by two further matters, the lifts and the stair balustrades. Both of these were the responsibility of the defenders or the defenders' subcontractors. They accordingly operated

as concurrent causes of the delay. The delay caused by these two items was such that completion could not have occurred any earlier than it did. This contention raises the issue of concurrent causes, discussed at paragraphs [18]-[19] above. Before considering that issue, however, I must deal with the evidence relating to the lifts and the stair balustrades.

[133] In relation to the lifts, in the defenders' programme work was originally planned to start on 16 September 1998. Completion was scheduled for 8 December 1998. The defenders' original subcontractor was Nationwide Lifts. Discussions between the defenders and Nationwide had taken place prior to the site meeting held on 25 March 1998 (No 7/13 of process, paragraphs 3.1.4 and 3.4.6). At that time RMJM wanted to see the subcontractor's proposals. At the next site meeting, held on 27 April 1998, it was noted that drawings were awaited from Nationwide (No 7/14 of process, paragraph 01-3.1.3). The defenders stated that the procurement period for the manufacture of the lifts would be 15 weeks after drawing approval. At site meeting No 7, held on 12 August, information was still outstanding from Nationwide (No 7/36 of process, paragraph 05-3.4.3). It is recorded that the defenders had met the managing director of Nationwide "to emphasize serious concerns on lack of performance from Nationwide and to re-state specific information required". The defenders were also exploring alternative suppliers at this time. At site meeting No 8, held on 9 September 1998 the defenders advised the pursuers that they were the seeking an alternative lift supplier (No 6/17 of process, paragraph 05-3.4.3). By the time of site meeting No 9, held on 7 October, the defenders had selected an alternative lift supplier, and drawings had been supplied to RMJM, with some data outstanding (No 6/17 of process, paragraph 05-3.4.3). At the next site meeting, No 10, held on 4 November 1998, it was noted that the defenders had presented a lift sample to the pursuers, who had indicated that the lift was acceptable. The defenders were to meet the lift supplier on 5 November to receive further details. RMJM stressed the need for technical information to be provided. In the programme annexed to the minutes of that meeting (No 7/42 of process) the lift installation was omitted. At about that time, however, the defenders had produced a 57-week programme (No 7/45 of process), which indicated an intention to complete the lift installation and commissioning by 8 February 1999. In fact work on the lifts began on 1 December 1998 and was completed on 24 March 1999 (recorded in the joint minute). Even with the second subcontractor, progress appears to have been fairly slow (Clerk of Works' diary, 21 and 22 December 1998, 22, 25, 27 and 29 January 1999 and elsewhere). No extension of time was sought by the defenders for delay arising from the lift installation.

[134] Mr Whitaker ultimately conceded (day 15, 11.18) that the lifts had been installed late, and that this was a problem for which the defenders had been responsible. He further accepted that it involved a delay that was concurrent with other delays until 23 March 1999. Mr Lowe was of opinion that Practical Completion could not have taken place until the work to the lifts had been completed.

[135] In my opinion the pursuers were correct in asserting that Completion was delayed by work on the lifts. That delay was the responsibility of the defenders and their subcontractors; indeed, the defenders do not argue the contrary. I accordingly conclude that the delay in completing the lift installation was a concurrent source of the delay in Completion. That delay lasted until 24 March, when it is agreed that the lift installation was completed.

Delay by defenders: stair balustrades

[136] In the Bills of Quantities stair balustrading and finishes are listed as provisional sums. It is noted that the works are to be executed by a domestic subcontractor. In the defenders' original construction programme (No 7/156 of process) stair balustrading appears in the "finishes" section. The dates for starting and finishing this activity were 14 October 1998 and 24 November 1998 (Mr Whitaker's logic-linked version of the programme, No 7/156 of process, Appendix D). In the revised 57-week programme put forward at site meeting No 13 on 3 February 1999 the completion date was altered to 8 February 1999. Because certain of the concrete work was of poor quality, the defenders required to carry out skim finishing to the stairs. The quality of the concrete is noted in the minutes of site meeting No 6, held on 15 July 1998, where it is recorded that there was discussion on "current inappropriate quality of concrete related to required finish to walls". The matter was raised again at site meeting No 7 on 12 August (No 7/36 of process, paragraph 06-3.2.1 and 3.4.3) and site meeting No 8 on 9 September (No 6/17 of process), where it was noted (paragraphs 6-3.2.1 and 3.4.3) that the defenders were to provide proposals for the stair, atrium and lift lobby walls to remedy "inaccuracies/poor quality arrises/edges in concrete". At site meeting No 9, held on 7 October 1998, it was recorded (at paragraph 6-3.4.3):

"[Mr Cornish] advised all concrete in atrium and lift lobby will be skim plastered to remedy inaccuracies in concrete. [Mr Cornish] confirmed angle edge beads will be used to ensure straight, clean edges of concrete".

That work was necessary in order to carry out the work on the stair balustrades and finishes. The relevant architect's instructions (Nos 78 and 105) were issued on 4 September and 14 October 1998. The actual start of work on the stair balustrades occurred on 18 December 1998, and the actual completion date was 12 April 1999 (joint minute).

[137] Problems occurred as the stair balustrading work continued. The Clerk of Works noted concerns about quality on 2 March 1999 and recorded that the need to carry out drilling for base plates created dust, which had an impact on the snagging of the atrium area (9, 11 and 12 March 1999; Mr Cornish, day 7, 12.37). Although it is agreed that completion occurred on 29 April, some snagging work occurred as late as 20 April (Clerk of Works' diary). It was not possible to achieve Practical Completion without the main stair and the fire escape stairs; for these to the available for use the balustrading had to be complete, as the handrail was obviously necessary (Mr Cornish, day 7, 12.47). The defenders did not seek any extension of time in respect of the stair balustrades.

[138] In my opinion completion was delayed by the work on the stair balustrades. That delay was the responsibility of the defenders as contractor; that was not in dispute. I accordingly conclude that the work on the stair balustrades and

the stair finishes was a concurrent source of the delay in completion. That delay lasted until 12 April 1999, which is agreed in the joint minute to be the date when work on the balustrades ended.

[139] I should mention one further matter. In their written submissions the pursuers referred to certain other items of work that were said to have delayed Practical Completion and which were the responsibility of the defenders or their subcontractors. These included the installation of utilities and lagging in the plant room. Both of these, however, were considered by Mr Lowe not to be on the critical path. It follows that the only delay that they can have caused to Practical Completion is the delay in their own completion. It is not entirely clear when work on utilities came to an end; the gas supply to the hotel was turned on on 15 February, and the gas main itself appears to have been installed either on or shortly after 5 February (Mr Cornish, day 7, 3.08). In all the circumstances I do not regard this activity as of great significance. It was not explored at great length in evidence, and it is not clear on the evidence what the causes of the delay were; it is impossible to exclude the possibility that progress was slow simply because it was known that completion was going to be delayed for other reasons. Lagging in the plant room appears to have continued, according to the Clerk of Works' diary, for most of February and until 10 March. On 15 March it is recorded that the defenders were cleaning up in the plant room. The issue of the plant room lagging was first raised by the pursuers in cross-examination of Mr Whitaker. Counsel for the defenders objected to the line of evidence, on the basis that it had not been put to Mr Cornish during his cross-examination. That objection was maintained in submissions. In my opinion the objection was well founded, and I sustain it. Mr Cornish was the obvious witness of fact on this matter, and elementary fairness dictates that it should have been put to him. He might have been able to provide some reason for the apparent delay. For this reason I will disregard the issue of the plant room lagging.

Clause 13.8

[140] The next issue that must be considered is the application of clause 13.8 of the Conditions of Contract. Clause 13.8 sets out certain procedures that are to be followed if the contractor considers that any architect's instruction or the equivalent will require either an adjustment to the contract sum or delay the completion date. So far as material it is in the following terms:

"13.8.1 Where, in the opinion of the Contractor, any instruction, or other item which, in the opinion of the Contractor, constitutes an instruction issued by the Architect, will require an adjustment to the Contract Sum and/or delay the Completion Date, the Contractor shall not execute such instruction (subject to Clause 13.8.4) unless he shall have first submitted to the Architect, in writing, within 10 working days (or within such other period as may be agreed between the Contractor and the Architect[)] of receipt of the instruction, details of:

1. *Initial estimate of the adjustment (together with all necessary supporting calculations by reference to the Contract Documents);*
2. *Initial estimate of the additional resources (if any) required and his method statement for compliance;*
3. *Initial estimate of the length of any extension of time to which he considers he is entitled under Clause 25 and the new Completion Date (together with all necessary supporting documentation by reference to the Master Programme);*
4. *Initial estimate of the amount of any direct loss and/or expense to which he may be entitled under Clause 26; and*
5. *Any such other information as the Architect may reasonably require.*

13.8.2 The Contractor and the Architect shall then, within 5 working days of receipt by the Architect of the Contractor's estimates, agree the Contractor's assessments. Following such agreement, the Contractor shall immediately thereafter comply with the instruction and the Architect shall grant an extension of time under Clause 25.3 of the agreed length (if any) and the agreed adjustments (if any) and the agreed adjustments (if any) in relation to clauses 13.8.1.1 and 13.8.1.4 shall be made to the Contract Sum.

13.8.3 If agreement cannot be reached within 5 working days of receipt by the Architect of the Contractor's estimate on all or any of the matters set out therein; then;

1. *the Architect may nevertheless instruct the Contractor to comply with the instruction; in which case the provisions of Clauses 13.5, 25 and 26 shall apply; or*
2. *the Architect may instruct the Contractor not to comply with the instruction, in which case the contractor shall be reimbursed all reasonable costs associated with the abortive [instruction].*

13.8.4 The Architect may, by notice to the Contractor before or after the issue of any instruction, dispense with the Contractor's obligation under Clause 13.8.1, in which case the Contractor shall immediately comply with the instruction and the provisions of Clauses 13.5, 25 and 26 shall apply.

13.8.5 If the Contractor fails to comply with any one or more of the provisions of Clause 13.8.1, where the Architect has not dispensed with such compliance under Clause 13.8.4, the Contractor shall not be entitled to any extension of time under Clause 25.3".

[141] The terms of clause 13.8 were considered by Lord Macfadyen when the action was at debate; his decision is reported at 2002 SLT 781. Lord Macfadyen made the following comments (at 793):

"[30] In my opinion, the language of clause 13.8 is prima facie applicable to all architect's instructions, including those in respect of the expenditure of provisional sums. There is no qualification of the reference in clause 13.8.1 to architect's instructions to suggest that any subcategory of such instructions is to be excluded from the scope of the clause. The repetition of the substance of clause 13.3.1 in clause 13.8.6, although apparently redundant, lends support to the contention that clause 13.8 applies, without distinction, to all architect's instructions.

...

[32] In my view a distinction falls to be drawn between, on the one hand, a late instruction which, simply because of its lateness, gives rise to a need to adjust the contract sum and/or grant an extension of time and, on the other hand, an instruction which, although late, is of such a nature that it would, whenever issued, have given rise to a need to make such an adjustment or grant such an extension. The latter category of instruction falls, in my view, within the scope of clause 13.8, whereas the former does not. It is in my view difficult to formulate the distinction more precisely in the abstract. It would, in my view, be wrong to say simply that clause 13.8 has no application to late instructions. On the other hand, a failure to comply with clause 13.8 will not, in my view, exclude a claim for extension of time in so far as the extension is made necessary by the lateness of the instruction as distinct from its content.

...

[35] In my opinion the architect's power under clause 25.3.3 [to grant extensions of time] must be read subject to the special provision of clause 13.8.5. Clause 13.8.5 defines the effect of failure to comply with the provisions of clause 13.8.1 as being that 'the Contractor shall not be entitled to any extension of time under clause 25.3'.... The contractor's right to [an extension] is, therefore, in my opinion, removed, in terms of clause 13.8.5, if the contractor fails to comply with the provisions of clause 13.8.1".

When the defenders reclaimed against Lord Macfadyen's decision his opinion on the foregoing matters was not challenged.

[142] Nevertheless, in his submissions senior counsel for the pursuers contended that Lord Macfadyen's construction of clause 13.8 was mistaken. He emphasized the wording of clause 13.8.1, which refers to "any" instruction which in the opinion of the contractor would require an adjustment to the Contract Sum or delay the Completion Date. No distinction is made between content and timing; instead all that is relevant is the impact of an Architect's Instruction on cost or completion. The wording of the remainder of the clause was likewise mandatory; clause 13.8.5 denied the contractor a right to "any extension of time under clause 25.3".

[143] In my opinion Lord Macfadyen's construction of clause 13.8 is clearly correct. That construction is based on a distinction between delay caused by the lateness of an instruction and delay caused by its content; the clause applies to the latter type of delay but not to the former. That makes practical sense. This can be seen by considering a hypothetical example where the delay is clearly caused by lateness alone. Suppose that external walls are to be covered in render of a particular specification, the colour to be advised by the architect. According to the contractor's programme work on the render is to start on 15 October and, because of a 14-day lead-in time, information on the colour is required by 1 October. The architect instructs the colour on 10 October. Because of the lead-in time, work cannot begin until 25 October. In those circumstances, what would be the point of using the clause 13.8 procedure when the architect's instruction was received on 10 October? There is no additional cost. So far as lateness is concerned, delay is inevitable because the instruction was 10 days late. Using the clause 13.8 procedure does not give the architect the option of cancelling it, or instructing something else; that would merely add to the delay. The sensible course is clearly that the contractor should proceed with the work immediately. In my opinion the clause cannot have been intended to operate in such circumstances. The same must be true in all cases where delay is caused by the mere lateness of an instruction or variation, rather than its content. In conclusion, I would merely add that clause 13.8 does not appear to have been well thought through. It is, so far as I am aware, an unusual clause, innovating upon the standard JCT scheme. In these circumstances I do not see any need to give it a liberal construction; it should be construed so that it does not operate where it makes no contractual sense. Moreover, support for Lord Macfadyen's construction can be found in the wording of clause 13.8.1 itself. Where the content of an instruction is the problem, it can be said that it is the "instruction" (the word used in clause 13.8.1) that has caused the delay. Where delay in the lateness of the instruction is the source of the problem, however, it is the lateness rather than the instruction that causes the delay. Exactly the same analysis applies to variations. A variation may or may not cause delay because of its content. If the work instructed is fundamentally different, it is quite possible that the content will give rise to delay. Where the variation is relatively minor, however, it is unlikely that content will cause delay; nevertheless, if the variation is issued late that may cause delay, and the example given above is still in point. In every case it is necessary to examine the particular instruction or variation to discover whether any resulting delay is caused by lateness or content.

[144] On this basis, I am of opinion that with one exception all of the Architect's Instructions founded on by the defenders for the purposes of the counterclaim are outwith the scope of clause 13.8. In every case except the gas venting, for the reasons discussed above in relation to the individual Architect's Instructions, I consider that it was the lateness rather than the content of the Instruction that caused the delay to completion. The result is that in none of these cases does clause 13.8 preclude the defenders from claiming an extension of time under clause 25. In relation to the gas venting scheme, the defenders admitted that it was content rather than lateness that caused the delay. In this case the defenders did not make use of the clause 13.8 procedure. In these circumstances it is necessary to consider the issues of waiver and personal bar.

Waiver and personal bar

[145] Waiver involves the abandonment of a right: *Armia Ltd v Daejan Developments Ltd*, 1979 SC(HL) 56, at 69 per Lord Fraser of Tullybelton; and at 72 per Lord Keith of Kinkel. The word "right" must in my opinion be relatively widely construed. It should include not only a right in the narrowest sense, consisting of a claim against another person, but should also extend to other forms of legal entitlement. These include entitlements that may more properly be described as a privilege or an immunity; a privilege is an entitlement to prevent another person from exercising a claim-right, and an immunity is an entitlement to prevent another person from exercising a power. (The terminology

used here is derived from W.N. Hohfeld, Fundamental Legal Conceptions as applied in Judicial Reasoning, (New Haven, 1923)). I am of opinion that the pursuers' right to invoke clause 13.8 is properly characterized as an immunity; the defenders have a power to use that clause to claim an extension of time, and the pursuers have an immunity against that power if the defenders do not fulfil the requirements of the clause. In my opinion an immunity can be the subject of waiver. That view is I think supported by the decision of Lord Eassie in ***E & J Glasgow Ltd v UGC Estates Ltd***, [2005] CSOH 63, where (at paragraph [33]) he states:

"In a contractual context, waiver of a contractual term may necessarily imply that something which does not satisfy all the contractual conditions is yet to be treated as being within those provisions because the party having an interest to insist on full satisfaction has either expressly, or by implication arising from the factual circumstances, waived his right to insist on one or more of the contractual conditions being duly fulfilled. In ordinary usage, waiving a contractual term is indeed to say that one is not insisting on one's right to require due observance of the term....[T]he authorities illustrate that a contractual term which is definitive of a contractual entitlement may be waived".

[146] The defenders issued a series of notices in terms of clause 25 of the Contract Conditions (Nos 7/130-7/152 of process). For the purposes of the following analysis I will concentrate on the first of these (No 7/130), which related to the gas venting scheme; nevertheless I think that exactly the same analysis applies to the later notices. The first delay notice was issued on 31 March 1998 (see paragraph [44] above). It narrated that delay was likely to occur in the progress of the works as a result of the instruction relating to the new gas venting system, using the Proofex membrane. It narrated the alleged causes of the delay in some detail. That notice was issued eight days after the instruction to use the Proofex membrane, that instruction having been issued on 23 March. The issue was discussed at a project review meeting held on 8 April 1998 (discussed at paragraph [45] above; the minutes are No 6/31 of process). The meeting was attended by Mr Dibben on behalf of the defenders and Mr Sandy Orr on behalf of the pursuers. Mr Dibben alone gave evidence about the meeting (day 9, 10.57 onwards). He reported the delay; Mr Orr's response was that he was not prepared to accept that the third stage of the contract the defenders could be incurring a potential delay. According to Mr Dibben, Mr Orr had stated that the defenders were not getting an extension of time. When he was asked subsequently whether any representative of the pursuers at that meeting said that there would be no extension of time because the defenders had not operated clause 13.8, Mr Dibben stated that he did not think that the clause was ever mentioned (day 9, 12.43).

[147] Later, on 9 October and 17 November 1998 letters were written by the architect, RMJM, in relation to the claim for an extension of time as a result of the gas venting instructions (Nos 6/36 and 6/37 of process). Nothing was said in these letters about clause 13.8. Instead, the defenders' claim was rejected because, it was said, the defenders had agreed to absorb the delay; I discuss this matter at paragraph [45]. Moreover, the letter of 9 October dealt with claims under express reference to clause 25. RMJM indicated that in their view the gas venting instruction constituted, a Relevant Event under clause 25.4.5.1, and that event caused the defenders delay. A similar point can be made in relation to other letters from the architect; these include RMJM's letter of 26 August 1998 (No 7/133 of process) and their letter of 19 October 1998 (No 7/157 of process). In the second of these letters RMJM granted an extension of time, despite the defenders' failure to operate clause 13.8.

[148] The pursuers argued that there was no evidence to suggest that they were directly involved in any decisions relating to extension of time taken by the architect. Consequently the defenders required to rely on the actings of the architect as agent of the pursuers. Nevertheless, the architect had no implied authority to vary or waive the terms of a building contract. Reference was made to Hudson on Building and Engineering Contracts, 11th ed, paragraphs 2.058-2.060; to ***Toepfer v Warinco AG***, [1978] Ll Rep 569, at 577; and to Keating on Building Contracts, 7th ed, at paragraph 11.10. The architect had no ability to affect the legal relationship between the employer and the contractor: ***Charles Rickards Ltd v Oppenhaim***, [1950] 1 KB 616, at 626 per Denning LJ. These authorities and textbooks do, I think, establish that an architect has no power to vary or waive the terms of a building contract in relation to matters of substance. Thus the passage cited from Hudson provides a number of examples to illustrate the general inability of the architect to commit the owner to any change of the building contract. All of these go to the substance of the contract, or the substance of claims under the contract; they do not relate to matters of mere procedure. It is obvious that the architect should not have authority to vary the substance of the obligations of the contractor except to the extent that he has given power to do so by provisions such as clause 13 of the present form of contract. The contractor's basic function is to provide the works required by the employer, and the architect's responsibility is to ensure that he does that. In the administration of a complex contract, however, it is not uncommon to find that the procedural requirements of the contract are not followed to the letter. This is hardly surprising; if matters seem straightforward or if the practical result that is desired is clear, the niceties of procedure may not seem important, and there is an obvious temptation to ignore them. In a construction contract most of the procedural requirements will be matters with which the architect is directly involved on the employer's behalf. Consequently the decision to dispense with procedural requirements is likely to be that of the architect. In my opinion the architect must have power to dispense with such requirements. If that were not so, the contractor could never acquiesce in any procedural shortcuts, however clear the substance might be, for fear that at some future date the employer would reject what the architect had done. The result would be that every detail of procedure would require to the followed to the letter unless the employer agreed to dispense with it. That seems to me to fly in the face of common sense; it would, I suspect, add greatly to the administrative burden of most building contracts. For this reason I am of opinion that the architect has power, at least under the JCT Standard Forms, to waive or otherwise dispense with the procedural requirements of the contract.

[149] Clause 13.8 must in my opinion be construed as imposing procedural requirements, rather than dealing with matters of substance. In respect of any extension of time, the substantive provision is clause 25; in respect of prolongation costs and other form of direct loss and expense, it is clause 26. Clause 13.8 is clearly conceived against the background of these two clauses. It applies where in the contractor's opinion any instruction will either require an adjustment to the Contract Sum or delay the Completion Date (clause 13.8.1). In that event, the contractor is directed not to execute the instruction without first submitting to the architect initial estimates of various matters, including the likely adjustment to the Contract Sum, the likely extension of time that will be required and the estimated amount of direct loss and expense under clause 26. Thereafter the contractor and the architect may, within five working days, agree the contractor's estimates; if they fail to do so the architect is given the choice of ordering compliance with the instruction, in which case the provisions of clauses 25 and 26 apply, or instruct the contractor not to comply with the instruction. Essentially, the however, the clause is designed to provide a pre-estimate of the cost in time and money of complying with a proposed instruction. In that way the cost can be agreed conclusively in advance; failing that the architect may decide to withdraw the instruction, usually, it may be supposed, because the cost is too great; or alternatively the architect can proceed with the instruction regardless, in which case clauses 25 and 26 apply. It follows in my opinion that the function of the clause is essentially procedural in nature. There is a facility to agree certain matters, but failing that the substantive provisions of the contract apply.

[150] One further aspect of clause 13.8 must be considered; this is the effect of clause 13.8.4 and clause 13.8.5. Clause 13.8.4 authorizes the architect, by notice the contractor, to dispense with "the contractor's obligation" under clause 13.8.1, in which case clauses 25 and 26 apply. Clause 13.8.5 provides that, if the contractor fails to comply with clause 13.8.1, he will not be entitled to any extension of time under clause 25. There is thus an express power to dispense with the requirements of clause 13.8.1, and the question arises as to whether this impliedly excludes waiver of the clause. In some cases an express power to dispense with a provision might well exclude a right of waiver. Nevertheless, I think that such cases are exceptional, and that the norm is that waiver should be available even when there is an express right of dispensation. My reason for this conclusion is twofold. First, waiver, like other forms of personal bar, is based on elementary considerations of justice; these are well expressed by Dixon J. in a passage cited in paragraph [154] below in relation to the right of estoppel in the law of Australia. If one party speaks or acts in such a way as clearly to suggest waiver, it may be obviously unfair to ignore what he has said or done. Secondly, in practice those involved in commercial relationships frequently act in an informal manner in their dealings with each other, no doubt because this enables their business to proceed quickly and efficiently. If effect is to be given to the parties' true intentions, objectively construed, these informal dealings must be recognized, and waiver and other forms of personal bar achieve this. I accordingly conclude that the architect had power to waive the requirements of clause 13.8 and to bind the pursuers by so doing.

[151] In relation to the gas venting scheme, I am of opinion that the pursuers waived the requirements of clause 13.8, both through their own actings at the meeting held on 8 April and through the actings of RMJM in their approach to the claim intimated on 31 March. The function of clause 13.8 is to ensure that, if an instruction or variation is issued, the question of delay and any financial consequences are dealt with immediately. In that way the architect is able to assess the consequences of the relevant instruction and to decide whether to maintain the instruction or to revert to the previous position. If an application is made for an extension of time, however, that flatly contradicts the scheme of the clause. That is in my opinion sufficient to put the architect on notice that clause 13.8 is not being used. The same applies to the employer if he becomes aware of the claim for an extension of time. Failure to invoke clause 13.8 is of significance, given its contractual importance, especially in working through the legal and financial consequences of the step that the architect proposes to take. If the claim is made for an extension of time, there is in my view a very obvious need to invoke clause 13.8, if the immunity conferred by that clause is truly to be invoked. In the present case no attempt was made to invoke clause 13.8, or indeed to refer to it in any way. In these circumstances, in particular having regard to the facts set out at paragraphs [146] and [147] above, I am of opinion that the immunity contained in that clause was waived. In drawing this inference I rely principally upon the immediate reaction to the defenders' claim, as disclosed at the meeting held on 8 April. It is clear from the minutes of that meeting that the claim for an extension of time was discussed at length. In view of the apparent importance of clause 13.8, it would be very surprising if no mention were made of the clause unless either the pursuers or the architect, acting on their behalf, had decided not to invoke the clause. It is adding significance of both representatives of the pursuers and representatives of RMJM were present at the meeting, yet neither mentioned the clause.

[152] One further requirement of waiver is that the person asserting it must have conducted his affairs in reliance on the waiver, although there is no need for him to have acted on it to his prejudice: ***Armia Ltd v Daejan Developments Ltd***, *supra*, per Lord Fraser of Tullybelton at 69 and per Lord Keith of Kinkel at 72. In the present case I am of opinion that the defenders did clearly act on the basis of the waiver at the meeting held on 8 April, in that they pursued a claim under clause 25 without any reference to clause 13.8. No doubt, if clause 13.8 had been applied strictly, the defenders would have been out of time prior to 8 April, but that did not happen. The defenders continued to pursue claims under clause 25 in relation to both the gas venting scheme and the various other sources of delay discussed previously, and that is in my opinion sufficient to satisfy the requirement of conducting affairs in reliance on the waiver.

[153] For the pursuers it was submitted that the defenders had led no evidence to suggest that the architect was even aware of the terms of clause 13.8 when he issued decisions in relation to applications for extension of time. Waiver of a right cannot be inferred from circumstances that may be consistent with its retention; moreover, because waiver involves the abandonment of a right for all time it cannot be based on a mere oversight. Reference was made to

Evans v Argus Healthcare (Glenesk) Ltd, 2001 SCLR 117, at paragraph [11]; to ***Armia Ltd v Daejan Developments Ltd,*** *supra*, at 69 and 71-72; and to ***Oak Mall Greenock Ltd v McDonald's Restaurants Ltd,*** 9 May 2003. I agree with the general propositions advanced on this matter. Nevertheless, I do not think that it can be supposed that the architect was unaware of the terms of clause 13.8. It must generally be presumed that an architect is aware of the whole of the terms of the building contract under which he is acting; that seems fundamental to the architect's responsibilities. Moreover, at the meeting held on 8 April representatives of the pursuers were present. In these circumstances I consider that an inference of waiver can be drawn. The result is that the pursuers cannot invoke clause 13.8 as an immunity against a claim for an extension of time under clause 25.

[154] The defenders also rely on the principle of personal bar. The classic statement of personal parties of clause that of LC Birkenhead in ***Gatty v Maclaine***, 1921 SC (HL) 1, at 7:

"Where A has by his words or conduct justified B in believing that a certain state of affairs exists, and B has acted upon such belief to his prejudice, A is not permitted to affirm against B that a different state of fact existed at the same time".

The rationale of the doctrine of personal bar is set out by LP Rodger in ***William Grant & Sons Ltd v Glen Catrine Ltd,*** 2001 SC 901; citing Dixon J. in ***Grundt v Great Boulder Pty Gold Mines Ltd,*** (39) 59 CLR 641, at 674-675, Lord Rodger said (at 921):

"[T]he basal purpose of the doctrine of estoppel 'is to avoid or prevent a detriment to the party asserting the estoppel by compelling the opposite party to adhere to the assumption upon which the former acted or abstained from acting. This means that the real detriment or harm from which the law seeks to give protection is that which would flow from the change of position if the assumption were deserted that led to it. So long as the assumption is adhered to, the party who altered his situation upon the face of it cannot complain. His complaint is that when afterwards the other party makes a different state of affairs the basis of an assertion of right against him then, if it is allowed, his own original change of position will operate as a detriment. His action or inaction must be such that, if the assumption upon which he proceeded were shown to be wrong and an inconsistent state of affairs were accepted as the foundation of the rights and duties of himself and the opposite party, the consequence would be to make his original act or failure to act a source of prejudice'".

[155] It is accordingly necessary for the defenders to establish both a representation, express or implied, that a certain state of affairs exists and actings on the faith of that representation, to the prejudice of the person who so acts. In relation to the gas venting instruction, I think that an implied representation can be inferred from the actings of both the pursuers and RMJM at the meeting held on 8 April. In this case, however, I am of opinion that it cannot be said that the defenders acted on such a representation to their prejudice. What they did was to pursue a claim under clause 25, without regard to the implications of clause 13.8. If clause 13.8 had been invoked, however, the defenders would have had no claim under clause 25 because any such claim was barred by clause 13.8.5. Thus they were not actually prejudiced. No doubt they incurred expense in pursuing the clause 25 claim, but I do not think that that is sufficient to amount to prejudice for the purposes of the law of personal bar.

[156] Because of the view that I have taken on the construction of clause 13.8, it is not necessary to consider how waiver or personal bar would apply to elements of the defenders' claim other than the gas venting instruction. In these cases, however, a broadly similar analysis would apply, subject to one exception. In relation to personal bar, as against waiver, I think that it could be said that there was prejudice, in that the defenders repeatedly failed to make use of the clause 13.8 procedures on the assumption that their claims were being dealt with under clause 25 alone.

Concurrent delays

[157] I accordingly conclude that the delay in completion was the result of concurrent causes. The majority of those were the result of the late instructions or variations issued by the architect, and are Relevant Events for the purposes of clause 25; two of those causes, however, the work on the lifts and the work on the stair balustrading, were the fault of the defenders or their subcontractors. In my opinion none of the causes of delay can be regarded as a "dominant" cause; each of them had a significant effect on the failure to complete timeously. The pursuers advanced an argument based on the proposition that the items involving contractor default, the lifts and the stair balustrades, were the "dominant" cause of the delay, but I am of opinion that this contention must be rejected. Indeed, the lateness of the instructions relating to the gas venting scheme and the roof steelwork had a major effect on the progress of the works, to a substantially greater degree than the items involving contractor default. Consequently the case is one of true concurrent causes. In those circumstances the correct approach is in my opinion that set out at paragraph [18] above. Clause 25 requires that the architect should exercise his judgment to determine the extent to which completion has been delayed beyond the Completion Date by Relevant Events, or non-contractor's risk events. Put another way, that involves a determination of the aggregate period within which the Works as ultimately defined should have been completed having regard to the incidence of Relevant Events. That determination must be made on a fair and reasonable basis, as required by clause 25. In a case such as the present where there is true concurrency between Relevant Events and events that involve contractor default, apportionment will frequently be appropriate. In my opinion this is such a case. Apportionment enables the architect to reach a fair assessment of the extent to which completion has been delayed by Relevant Events while at the same time taking into account the effect of other events which involve contractor default. Where the decision of the architect is challenged, the court must of course perform the same exercise.

[158] That leads on to the question of how the exercise of apportionment is carried out. That exercise is broadly similar to the apportionment of liability on account of contributory negligence or contribution among joint wrongdoers. In my opinion two main elements are important: the degree of culpability involved in each of the causes of the delay and

the significance of each of the factors in causing the delay. In practice culpability is likely to be the less important of these two factors. Nevertheless, I think that in appropriate cases it is important to recognize that the seriousness of the architect's failure to issue instructions or of the contractor's default may be a relevant consideration. The causative significance of each of the factors is likely to be more important. In this respect, two matters appear to me to be potentially important. The first of these is the length of the delay caused by each of the causative events; that will usually be a relatively straightforward factor. The second is the significance of each of the causative events for the Works as a whole. Thus an event that only affects a small part of the building may be of lesser importance than an event whose effects run throughout the building or which has a significant effect on other operations. Ultimately, however, the question is one of judgment.

[159] In the present case the defenders have established eleven matters that constitute Relevant Events. These matters, and the extent to which they delayed completion, are as follows:

1. Gas venting: 18 February (but concurrent with roof steelwork).
2. Roof steelwork: 1 March.
3. En suite fittings: 25 March.
4. Bedhead lighting: 19 February (or 17 February according to Mr Whitaker).
5. Trouser presses: 13 March.
6. Central atrium beam encasement: 1 March.
7. Fibre optic lighting: 15 March.
8. External mounted floodlights: 31 March.
9. Cooling to refuse room: 12 April.
10. Trees: 19 March.
11. External render: 8 March.

The pursuers have established two concurrent causes: the installation of the lifts, which delayed completion until 24 March, and the construction of the stair balustrades, which delayed completion until 12 April.

[160] The original Completion Date was 25 January 1999. On 4 June 1999 this was extended by Keppie Architects by four weeks, to 22 February. Practical Completion was certified by Keppie as having taken place on 29 March; that occurred retrospectively on 27 April. What actually happened on 29 March was that the pursuers took partial possession of certain parts of the Works, with possession of other parts being taken subsequently, on 13 and 30 April. Thus construction continued well into April, and certainly until 12 or 13 April; work on the cooling to the refuse room and the stair balustrades continued until 12 April. The defenders claim that they are entitled to an extension of time until 14 April, or 11 weeks in total. The pursuers claim that the defenders should have no extension, because none of the items relied on by them was on the critical path and none caused any delay to completion. I have already rejected the latter argument. Nevertheless, I consider that I must make some allowance for the lift installation and the construction of the stair balustrades, both of which delayed completion. That means that the period of 11 weeks claimed by the defenders must be reduced.

[161] In considering the extent to which that period should be reduced, the matters referred to at paragraph [157] must be considered. I do not consider culpability to the a major factor; nevertheless, the sheer quantity of late instructions following Keppie's appointment is I think significant; so is the fact that the failure to issue instructions occurred following requests for information which started (during the course of the Works) on 7 October 1998. So far as the causative significance of each of the events is concerned, all caused some delay, although the delay resulting from the gas venting instruction was concurrent with 3 1/2 weeks of the delay resulting from the late instruction relative to the roof steelwork. The two items that had the longest lasting effect were the cooling to the refuse room and the stair balustrades, both of which concluded on about 12 April. In relation to the causative significance of each of the events for the Works as a whole, I must I think take account of the fact that items such as the en suite fittings, the bedhead lights and the trouser presses affected all of the bedrooms in the hotel. Finally, I must take account of the fact that the number of Relevant Events is substantially greater than the number of items for which the defenders are responsible; moreover some of them, notably the gas venting and roof steelwork instructions, related to important matters that had significant effects on the overall progress of the Works. Taking all these circumstances into account, I am of opinion that the part of the total delay apportioned to Relevant Events should be substantially greater than that apportioned to the two items for which the defenders are responsible. I consider that a fair and reasonable result would be that the defenders are entitled to an extension of time of nine weeks from the original Completion Date. On that basis I conclude that completion has been delayed beyond the completion Date by Relevant Events for a period of nine weeks, or until 29 March 1999.

Prolongation costs

[162] In the counterclaim the defenders' fourth conclusion (as amended) is for payment of the sum of £27,069.10, inclusive of value added tax. This is said to represent the costs incurred by the defenders as a result of the prolongation of the contract works. In the joint minute it is agreed that, to the extent that the Works were prolonged beyond the original Completion Date, the defenders incurred loss and/or expense arising from the prolongation of the works from 25 January 1999 to 14 April 1999 (11 weeks and 2 days) in the sum of £11,518.80 plus value added tax per week. The sum concluded for in fact represents two weeks' prolongation costs. It is restricted in that way because the adjudicator awarded prolongation costs for nine weeks; consequently the counterclaim relates only to the two additional weeks claimed by the defenders.

[163] The defenders seek to recover their prolongation costs under clause 26 of the JCT Standard Form. Clause 26 has two formal requirements. First, the contractor must have must have made written application to the architect stating that he has incurred or is likely to incur direct loss and/or expense in the execution of the Contract because the regular progress of the Works had been was likely to be materially affected by failure to receive timeous instructions. Secondly the application must be made as soon as it had become, or should reasonably have become, apparent that the regular progress of the Works had been or was likely to be affected. In my opinion both of these requirements were satisfied in the present case. The defenders made a series of written applications to recover direct loss and expense that they alleged had been caused by prolongation; these are found in Nos 7/137, 7/141, 7/142, 7/144, 7/146, 7/147, 7/149 and 7/150 of process. It appeared that the applications were made as soon as it became apparent that the Works might be prolonged.

[164] The defenders' claim is based on clause 26.2.1; it is said that the defenders did not receive necessary instructions in due time. For the reasons discussed above in relation to the defenders' claim for an extension of time, I am of opinion that the defenders did not receive instructions in due time in respect of the roof steelwork and the nine items narrated above where instructions were given following the replacement of RMJM by Keppie. The reasoning applicable to an extension of time seems to me to be equally applicable to a claim for direct loss and expense based on clause 26.2.1. It was clear in my opinion that the regular progress of the Works was "materially affected" (clause 26.1) by the instructions that were not received in due time; that appeared from the evidence that is summarized above in relation to an extension of time. Mr Cornish was asked (day 4, 3.48) how satisfied he was that late instructions were critical to the defenders' completion of the Works. Mr Cornish replied that the late instructions were "completely critical". He went on to say that he was satisfied that they affected the regular progress of the Works "in a very profound way". I thought that these views were justified by the evidence as a whole. I accordingly conclude that the requirements of clause 26 are satisfied.

[165] For the pursuers it was submitted that the defenders' claim for propagation costs should be refused for the same reasons as were advanced in opposition to their claim for an extension of time. I have granted an extension of time, and consequently I reject this part of the argument. It was further submitted that, even if the defenders were entitled to an extension of time to resist liability for liquidated and ascertained damages, they were not automatically entitled to prolongation costs for an identical period. It was submitted in particular that, if a contractor incurs additional costs that are caused both by an employer delay and by a concurrent contractor delay, the contractor should only recover compensation to the extent that it was able to identify the additional costs caused by the employer delay as against the contractor delay. If the contractor would have incurred the additional costs in any event as a result of the contractor delay, he would not be entitled to recover those additional costs.

[166] It is I think correct that a claim for prolongation costs need not automatically follow success in a claim for extension of time. The wording of clause 26 differs from that of clause 25, and different considerations may apply. In the present case, however, I am of opinion that the claim for prolongation costs should follow the result of the claim for extension of time. In this respect the decision in *John Doyle Construction Ltd v Laing Management (Scotland) Ltd, supra,* may be relevant. In that case it is recognized at paragraphs [16]-[18] that in an appropriate case where loss is caused both by events for which the employer is responsible and events for which the contractor is responsible it is possible to apportion the loss between the two causes. In my opinion that should be done in the present case. This is a case where delay has been caused by a number of different causes, most of which were the responsibility of the employer, through the architect, but two of which were the responsibility of the contractor. It is accordingly necessary to apportion the defenders' prolongation costs between these two categories of caused. I consider that the same general considerations, the causative significance of each of the sources of delay and the degree of culpability in respect of each of those sources, must be balanced. On this basis, I am of opinion that the result of the exercise should be the same; I am unable to discover any reason for treating the two exercises under clause 25 and clause 26 on a different basis. I accordingly conclude that the defenders are entitled to their prolongation costs for nine weeks. This amount has in fact been paid to them in consequence of the determination of the adjudicator. Consequently no further sum is due at this stage.

[167] It will be apparent that I have rejected the pursuers' argument that, if prolongation costs are caused both by an employer delay and by a concurrent contractor delay, the contractor will not be entitled to recover such costs if he would have incurred them as a result of the contractor delay. That approach seems to be based on a rigidly logical application of the principles of causation as they apply in the general law of contract and delict. Under clause 26, however, as with clause 25, I am of opinion that such an approach is not appropriate; instead, the direct loss and expense sustained by the contractor should be apportioned between the events for which the employer is responsible and the events for which the contractor is responsible.

Conclusion

[168] For the reasons stated above I conclude that the pursuers are not entitled to declarator that the Completion Date is 25 January 1999; nor are they entitled to the other remedies sought in the principal action. The defenders moved to amend their defences by adding new fourth and fifth pleas-in-law, dealing with waiver and personal bar respectively. I will grant that motion and allow the defences to be amended. Thereafter I will sustain the defenders' second, third and fourth pleas-in-law in the principal action, the fourth being restricted to the issue of the gas venting instruction. On that basis I will assoilzie the defenders from the conclusions of the principal action. In respect of the counterclaim, I have decided that the defenders are entitled to an extension of time of nine weeks. In these circumstances I will sustain the defenders' first plea-in-law and grant a modified decree in terms of the first conclusion of the counterclaim; decree will be for declarator that the defenders are entitled to an extension of time of nine

weeks for the completion of the Works under the contract between the parties, with the Completion Date thereunder accordingly being 29 March 1999. I will sustain the defenders' second and third pleas-in-law and pronounce decree of reduction of the Certificate of Notification of Revision to the Completion Date and Certificate of Non-Completion issued by Keppie Architects on 9 June 1999; that will involve granting decree in terms of the second and third conclusions of the counterclaim. In view of my decision on prolongation costs, no further sum is due by the pursuers to the defenders. I will accordingly sustain the pursuers' second and sixth pleas-in-law in the counterclaim and assoilzie them from the fourth conclusion of the counterclaim.

Pursuer: Keen, QC, Higgins; McGrigor Donald
Defender: Borland; Pinsent Masons