Claim No: HT-07-351

IN THE HIGH COURT OF JUSTICE
QUEEN'S BENCH DIVISION
TECHNOLOGY AND CONSTRUCTION COURT
RICHARD FERNYHOUGH QC (Sitting as Deputy High Court Judge)
B E T W E E N:

COSTAIN LIMITED

Claimant

-and-

CHARLES HASWELL & PARTNERS LIMITED

Defendant

JUDGMENT

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INTRODUCTION

1. In this case Costain Limited ("Costain"), the well known construction and civil engineering contractor claims damages for breach of contract and/or negligence against the Defendant, Charles Haswell & Partners Ltd ("Haswell") which carries on business as specialist consulting civil engineers. In summary, Costain alleges that it engaged Haswell to advise Costain in relation to the design of suitable foundations on a project being undertaken by Costain. Costain acted upon Haswell's advice in carrying out the recommended ground treatment preparatory to the construction of foundations which were designed by Haswell. Costain alleges that the ground treatment works failed and that Haswell was in breach of contract and in breach of its common law duty of care in recommending and designing the ground treatment works. As a result, Costain alleges that Haswell's design was defective and failed to work so that Costain had to abandon it and had to substitute piled foundations which caused considerable extra costs and delay to the works, in respect of which Costain seeks to recover compensation by way of damages from Haswell.

2. The matter arises in the following way. In 2001 United Utilities Water Limited ("UU") wanted to provide new water treatment works at Lostock and a new sludge treatment plant and potable water pumping station at Rivington, near Bolton, Lancashire, collectively known as "the Lostock and Rivington Water Treatment Works" ("the Project"). This Project also known as the AMP3 Rivington and Lostock WDW Contract, comprised the design and construction of a direct filtration plant, including chemical handling, chlorine contact tank and washwater treatment plant, a new treated water reservoir of 35Ml capacity and associated pumping stations at Lostock and new washwater clarifiers and a new pumping station at Rivington. This case concerns only two of the structures to be constructed by Costain vis. the Rapid Gravity Filters building ("RGF") and the Inlet Works ("IW").

3. In September 2001 UU invited Costain to submit a tender for the design and construction of the Water Treatment Works. On 4 October 2001 Costain sent to Haswell a copy of the Tender Documentation which it had received and, in a covering letter, informed Haswell that Costain wished it to carry out the civil engineering design work required for the Water Treatment Works. Such design work included the design of the foundations for the structures and, for that purpose, within the Tender Documents was the Design Statement issued by UU which specified that *"Total and differential settlements of foundations and base slabs shall not exceed 25mm and 10mm respectively."* It is common ground between the parties that this specification for settlement tolerances is tight. It is also common ground that, at all material times, Haswell had notice of this Specification and it designed the foundations to comply with it. On about 11 October 2001, an introductory meeting took place between Costain, Haswell and Ondeo Degremont Ltd. ("OD") the Mechanical, Electrical & Process Designer. Shortly after this meeting, and, before any contractual terms had been discussed between them, Haswell commenced work on the design of the foundations for the structures. The information concerning the sub-soil conditions upon which Haswell based its foundation designs was provided in the form of a Ground Investigation Report dated 17 October 2001 from Norwest Holst Soil Engineering Ltd. ("the Norwest Holst Report") which had been provided to Costain by UU.

4. Haswell assigned Mr. Andrew Marsh to the task of recommending the design solution for the structures based upon the Norwest Holst Report. Mr. Marsh, who had only recently joined Haswell, holds a BSc in Geology, a MSc in Engineering Geology and is a Chartered Engineer.

Prior to joining Haswell, Mr. Marsh had 14 years experience working as an engineer undertaking all manner of ground investigations, geotechnical reporting and working on construction sites for highways, dams and development projects involving considerable earthworks and foundations. However, Mr Marsh had no previous experience of designing foundations after the ground had been treated by preloading. Mr. Marsh reported to Christine Wright, Haswell's Structural Engineer, in carrying out his work. In the period between Mr. Marsh starting work and 12 December 2001, there were discussions between Haswell and Costain concerning the type of foundations which could be used for the RGF and IW Buildings. Three different foundation designs were considered vis. piling, vibro-compaction and surcharging the sub-soil followed by conventional foundations. Of these piling was considered to be the most expensive. At all times Costain had made it clear to Haswell that Costain wished to keep its tender price as low as possible in order to secure the Project.

5. On 12 December 2001 Mr. Marsh sent to Ms. Wright a memorandum dated 12 December 2001 headed: "Preliminary Geotechnical Assessments". This memo consisted of a 5 page Report on the ground conditions at the site together with Preliminary Geotechnical Assessment Sheets ("PGAS") in respect of all the structures which were included in the Tender Documents. In the PGAS Mr. Marsh recommended a number of different design solutions for different structures including mass concrete foundations and piled foundations. In respect of both the RGF and IW structures Mr. Marsh recommended that conventional foundations could be constructed provided that the ground had previously been surcharged with a pre-load in order to take out significant settlements ("the ground treatment works"). He recommended a load of 70KPA (provided by an earth mound about 3-4m in height) should be applied for a duration of 6-8 weeks.

6. On about 10 January 2002 Costain submitted its tender for the Water Treatment Works to UU incorporating foundation designs based upon Haswell's recommendations contained in the PGAS. However, in that Tender, there is no identifiable sum included in respect of the surcharge treatment to the foundations of the RGF and IW structures.

7. On 22 January 2002 Mr. Marsh sent a memo to Steve Page, Haswell's Group Engineer, for onward transmission to Costain. In that memo Mr. Marsh gave further detail of how the surcharge procedure should be carried out and also commented that the surcharge solution was based upon the specified criteria in the Tender Documents being applied with the baseline point for the assessment of performance, taken as the commissioning of the structures. This memo was sent on to Costain and also to Montgomery Watson Harza Project Management Ltd. ("MWH"), UU's Consultants.

8. By letter dated 22 February 2002 UU awarded the Design and Build Contract to Costain. The form of the Contract was based on the GC/WORKS/1 (Edition 3) – Single Stage Design and Build Form of Contract. ("the Main Contract"). The Contract Sum was of the order of £23 million.

9. It had always been intended by Haswell that, if Costain's tender were to be accepted, then Haswell would wish a further site investigation to be carried out on their instructions so that a final detailed design of the foundations could be provided. To this end, on 18 March 2002 Haswell sent to Costain a memorandum setting out their requirements for the additional site investigation. Ultimately this further site investigation was carried out between 7 and 24 March 2002 by Costain Geotechnical Services under the direction and supervision of Haswell. The

results of this further investigation were recorded in the report from Costain Geotechnical Services entitled "Additional Ground Investigation, Rivington and Lostock, Harwich", Factual Report Contract No. 936/3147 dated 26 July 2002 ("the Costain Geotechnical Report"). Haswell's recommendations for the further site investigation were produced by Mr. Marsh and communicated to Mr. David Ouston of Haswell at a handover meeting on 15 March 2002. Mr. Marsh was handing over responsibility for the further requirements of the job to Mr. Ouston since Mr. Marsh was being reassigned by Haswell to work in Scotland. Mr. Marsh was not thereafter involved in the project again until 7 June 2002. Mr. Ouston is a Geotechnical Engineer with a Masters Degree in Applied Geology from the University of Manchester which he obtained in 1997. He began working for Haswell as a Contract Engineer in May 1997. He left Haswell in March 2001 later rejoined Haswell in January 2002 and stayed with them until April 2004. Mr. Ouston remained closely involved with the project until 13 July 2002 when he had an accident whilst playing cricket which caused him to be off work until some time in September 2002. Like Mr. Marsh, Mr. Ouston had no previous experience of designing or supervising a ground surcharging operation.

10. On 28 May 2002 Mr. Chris Jew, a Resident Engineer employed by Haswell, sent to Costain by fax a number of documents giving further details of the design and placing of the surcharge material. This material consisted of a memorandum from Mr. Ouston dated 18 March 2002 and a number of calculation sheets also prepared by Mr. Ouston and dated 28 May 2002. Again on 31 May 2002 Mr. Jew sent to Costain a further memorandum accompanied by three sketches all of which were prepared by Mr. Ouston and which gave further details for the surcharging procedure.

11. In June 2002 Haswell recommended that a drainage blanket of free draining granular material with a minimum thickness of 300mm should be laid immediately underneath the surcharge mound. At this time Haswell also recommended that piezometers should be installed in order to measure the pore water pressure in the ground to be surcharged and also recommended that wooden surveying pegs should be provided in a grid pattern across the whole of the surface of the surcharge mound.

12. Mr. Marsh was again consulted by Haswell in June 2002 concerning some doubts as to the efficacy of the ground treatment scheme raised by Mr. Bell of Costain. On 20 June 2002 Mr. Marsh sent an email to Haswell in which he confirmed that he was confident that the necessary settlements would occur within the 8 week window envisaged at tender stage.

13. The ground treatment works were commenced by Costain on 25 June 2002. By 17 July the fill comprising the surcharge was 2m high across the whole site. By 29 July the height of the surcharge had risen to 4m across the whole site. The surcharge mound was regularly monitored by Costain and readings were recorded showing what settlements had occurred over time. The level records run from 1 July 2002 until 16 September 2002 with a gap between 19 and 29 July 2002 when no data is available. During August 2002 concern was expressed by Haswell as to the reliability of the level data taken by Costain and it appeared that some of the vertical poles inserted in the surcharge mound to measure the settlement of the ground beneath the mound had been damaged and/or moved during the construction of the mound. After much discussion between the parties concerning the inadequacy of the monitoring data, it was agreed that a further 1m of material would be placed on the mound. This took place between 29 August and 4 September 2002. The mound remained in situ for a further 2 weeks or so and it started to be

removed by Costain on about 14 September 2002. By 30 September 2002 all but 1m of the 5m mound had been removed.

14. In a Surcharge Monitoring Report dated 20 September 2002, Haswell reiterated its concerns about the accuracy and reliability of the monitoring data as a basis for concluding whether or not the ground surcharge treatment had been effective as designed. The report advised that further tests should be carried out on the subsoil following the removal of the surcharge.

15. On 2 October 2002 Cone Penetration Tests ("CPT") were carried out under the supervision of Haswell on the subsoil under the surcharge mound which had, by now, been completely removed.

16. On 15 October 2002 Haswell produced its Settlement Analysis Report, which concluded that, on the basis of the CPT results, "*the likely differential movements between the structures at the pipe connections are therefore expected to be between 10mm and 30mm*". This prediction was outside the settlement tolerances specified in the Tender Documents.

17. Having considered the results of the CPT investigation, on 25 October 2002 Haswell wrote to Costain in the following terms:

> "*Further to the recent telephone conversation between yourselves and our Mr. C. Jew, we write to advise that after review and further analysis of the available information, the most appropriate foundation solution for the Rapid Gravity Filter and Inlet Works is piling.*
>
> *We will write further to expand on the reasons for the above*".

18. On 28 October 2002 Haswell again wrote to Costain giving further reasons for their recommendation that the RGF and IW structures should have piled foundations.

19. On 30 October 2002 Costain wrote to Haswell notifying Haswell that Costain would incur significant additional costs in carrying out the piling to the RGF and IW as recommended by Haswell and would be looking to Haswell for reimbursement of such additional costs.

20. On 4 November 2002 Haswell sent to Costain the final version of its Settlement Analysis Report. That report concluded:

> "*The likely differential movements between the structures at the pipe connections are therefore expected to be between 10mm and 30mm. Absolute settlements of up to 50mm could occur*".
>
> *The specification requires 25mm maximum settlement and Ondeo Degremont require a differential of 15mm as a process condition. The results in tables C and D indicate a possibility of 50mm and 30mm respectively.*
>
> *For the following reasons it is recommended that the Rapid Gravity Filters and Inlet Works structures are constructed on piled to foundations:*

…

….

The conclusion based on the above factors, given the lack of reliable data from the surcharge operation, is that piling offers the most robust method to minimise the risk to time, cost, and the long term performance of the structure and its process duty".

21. Finally, Costain instructed Haswell to prepare a new design for the foundations for the RGF and IW. Haswell provided a design for piled foundations on 31 October 2002 and Costain commenced the piling works as designed by Haswell on 14 November 2002.

CONTRACT – NO CONTRACT?

22. The first issue between the parties is whether or not there existed a binding contract between them for the provision by Haswell of the professional services described in the Consultancy Agreement. It is Costain's case that there was such a binding contract since, by June 2002, after lengthy negotiations, the parties had agreed all the necessary terms of their agreement save for the precise nature and extent of the architectural services to be provided by Haswell ("the Architectural Issue"). Thereafter Costain's case is that the Architectural Issue was accepted by Haswell either expressly or by conduct so that all the terms of the contract between the parties were in fact agreed.

23. It is Haswell's case that the Architectural Issue was never finally agreed between the parties and, since it was an essential term and not regarded by the parties as severable from the Consultancy Agreement as a whole, it follows that there was no binding contract ever made between the parties. That is notwithstanding the fact that Haswell carried out and completed its professional duties in relation to the Project and was paid for them by Costain as if a binding contract had been entered into.

Background

24. Although, in the upshot, the Architectural Issue, which is the only issue which divides the parties on this point, is a narrow one, it is necessary to look at the course of the negotiations between the parties in order to understand its significance.

25. In September 2001 Costain was invited by UU to tender for the design and construction of the Project. On 4 October 2001 Costain in turn wrote to Haswell inviting it to tender for the Civil Engineering design work in connection with the scheme. Prior to this, Costain and Haswell had worked together on a previous scheme during which a Consultancy Agreement had been entered into. Thereafter on 11 October 2001 a meeting was held attended amongst others, by Mr. Colin Bell, Bid and Design Manager for Costain, Mr. Chris Jew, Senior Engineer for Haswell, Mr. Andy Johnson, Director of Haswell and representatives from OD. At this introductory meeting it was confirmed that Haswell would be the designer for the civil engineering aspects of the Works and that OD would be Costain's Sub-Contractor. It was also agreed that the agreement to be made between Costain and Haswell would be based upon a Consultancy Agreement previously made between them on a different project.

26. On 7 November 2001 Costain sent Haswell a copy of a draft written Consultancy Agreement which covered Haswell's appointment at tender stage and then at contract stage, if Costain were to be awarded the Main Contract. Schedules 1 and 2 of the draft described respectively the scope of services to be provided by Haswell and the terms of payment.

27. On 21 December 2001 Haswell sent to Costain a letter, drafted by Mr. Steven Page, in which it commented upon the draft Consultancy Agreement and enclosed its own "Bid Proposal" in which it set out in some detail the nature of the services which Haswell was offering to provide together with its fee proposal.

28. By way of reply, on 8 January 2002, Costain wrote to Haswell expressing its disappointment at its Bid Proposal and proposing a meeting to try to find a way forward.

29. After further discussions between the parties, Haswell, on 23 January 2002, sent to Costain a "Revised Bid Proposal" to which, by its letter dated 20 February 2002, Costain confirmed its general agreement subject to a number of outstanding items. One of these items concerned which standard form document should be used to describe the architectural services to be provided by Haswell, viz. the RIBA SFA/92 or the RIBA Design and Build SFA/92. It was this issue which later became known as "the Architectural Issue".

30. Haswell did not reply immediately to Costain's letter dated 20 February 2002 and further correspondence ensued between Mr. Peter Hardingham, Area Quantity Surveyor for Costain and Mr. Steven Page on behalf of Haswell.

31. As a result of these further exchanges, it is common ground between the parties, that, following Haswell's agreement to Costain's monthly fee proposal made on 7 June 2002, the parties had reached agreement on all material items forming their proposed agreement with the exception of the Architectural Issue. This was referred to as outstanding in an email sent on 10 June 2002 by Mr. Hardingham to Mr. Page.

32. There was no reply to that email from Haswell and so, on 22 July 2002, Mr. Hardingham sent a letter to Mr. Page enclosing a copy of the final draft of the Consultancy Agreement which reflected all the points agreed up to 7 June 2002 and included Costain's proposals on the Architectural Issue. In this regard Costain proposed, in Clause 22 of Schedule 1 to the Consultancy Agreement, which described the services to be provided, that the architectural services should be as described in certain identified sections of the RIBA SFA/92 Design and Build Form.

33. On 14 August 2002 Mr. Page replied by email to Costain's letter of 22 July and suggested that the description of the architectural services should be taken from the RIBA Standard Form of Agreement 1992 rather than the Design and Build Form. This email generated a detailed response from Mr. Hardingham which was set out in his email dated 3 October 2020. In his email Mr. Hardingham argued that reference to the Design and Build Form was preferable to the Standard Form and concluded as follows:

> "*We are still of the view that we are all better off with the D&B Form albeit that some items may not be required in full as opposed to the "Traditional" Form and to then have to start adding in the omissions required for D&B*".

34. Haswell never replied to Mr. Hardingham's email of 3 October 2002 despite Mr. Hardingham sending reminders to Mr. Page and much later, on 27 March 2003, to Mr. Andy Johnson enclosing a copy of the Consultancy Agreement and asking Mr. Johnson to arrange for its signature. But Haswell never signed or returned or commented upon the Consultancy Agreement until very much later.

35. In his witness statement dated 16 November 2008, Mr. Hardingham deposed that thereafter he frequently saw Andy Johnson and would often asked him to get the Consultancy Agreement signed. Mr. Johnson would say "*I will get that done*". But he never did. Neither did Mr. Johnson indicate that there was any outstanding issue to be agreed or that there was any other problem preventing the Agreement being formally signed. As he put it, it was just a case of the relevant signatories "*getting round to it*". Costain only became aware that Haswell was not going to sign the Consultancy Agreement on receipt of Haswell's letter dated 8 October 2003 which was over 12 months after Mr. Hardingham's email of 3 October 2002.

36. Thus the last "*shot*" in this contractual sequence of contractual communications ended with Mr. Hardingham's email of 3 October 2002. Of course, by that time, the dispute had already arisen between the parties and it may be that Mr. Hardingham, on checking the file, realised that he did not have a copy of the Consultancy Agreement signed by Haswell. Thereafter Haswell continued to provide to Costain all the services called for under the Consultancy Agreement, both engineering and architectural and Mr. Hardingham said in cross-examination that, when he frequently reminded Mr. Johnson about getting the Consultancy Agreement signed, it became apparent to Mr. Hardingham that this was unlikely ever to occur on account of the existing dispute and that was how the matter was left.

37. In its closing submission, Costain puts its case as to the formation of the contract in three different ways:

    (i) That Costain's email of 3 October 2002 accepted Haswell's "*offer*" of 14 August 2002 on all issues including the Architectural Issue; alternatively

    (ii) Haswell expressly accepted Costain's "*offer*" of 3 October 2002, by Mr. Johnson's agreement of the terms and by his statement that he would get the Contract documents signed by Haswell; alternatively

    (iii) Haswell accepted Costain's "*offer*" of 3 October 2002 by its conduct in completing the performance of all of its services in accordance with the terms of that offer.

    Miss Nerys Jefford QC, Leading Counsel on behalf of Haswell, observes that only the third alternative had been pleaded by Costain.

Decision on Contract Formation

38. The legal principles which govern this type of dispute are well known and are set out in a number of recent and authoritative decisions such as Pagnan SPA v Feed Products Limited [1987] 2 Lloyd's Rep. 601, G. Percy Trentham Limited v Archital Luxfer [1993] 1 Lloyd's Rep. 25 and, most recently, Haden Young Limited v Laing O'Rourke Midlands Limited [2008] EWHC 1016

(TCC). There is no dispute between the parties in this case as to the relevant principles to be applied.

39. The salient features of the present case are firstly that the alleged contract was fully performed by Haswell so that this is a case of a fully executed alleged contract. Secondly, the Consultancy Agreement is a sophisticated commercial contract and both parties accept that its terms were fully agreed save for the description of the architectural services to be provided by Haswell. Even this dispute was limited to the question of which of two Standard Form Contracts issued by the RIBA was to govern the description of the architectural services to be provided. All the other terms, including the fees to be paid to Haswell for its services were agreed.

40. In these circumstances the guidance provided by Steyn L.J. in the case of G. Percy Trenthan Limited v Archital Luxfer [1993] 1 Lloyd's Rep. 25, at 27 is particularly relevant:

> *"It seems to me that four matters are of importance. The first is the fact that English law generally adopts an objective theory of contract formation. That means that in practice our law generally ignores the subjective expectations and the unexpressed mental reservations of the parties. Instead the governing criterion is the reasonable expectations of honest men. And in the present case that means that the yardstick is the reasonable expectations of sensible businessmen. Secondly, it is true that the coincidence of offer and acceptance will in the vast majority of cases represent the mechanism of contract formation. It is so in the case of a contract alleged to have been made by an exchange of correspondence. But it is not necessarily so in the case of a contract alleged to have come into existence during and as a result of performance. … The third matter is the impact of the fact that the transaction is executed rather than executory. It is a consideration of the first importance on a number of levels. … The fact that the transaction was performed on both sides will often make it unrealistic to argue that there was no intention to enter into legal relations. It will often make it difficult to submit that the contract is void for vagueness or uncertainty. Specifically, the fact that the transaction is executed makes it easier to imply a term resolving any uncertainty, or, alternatively, it may make it possible to treat the matter not finalised in negotiations as inessential. In this case fully executed transactions are under consideration. Clearly similar considerations may sometimes be relevant in partly executed transactions. Fourthly, if a contract only comes into existence during and as a result of performance of the transaction, it will frequently be possible to hold that the contract impliedly and retrospectively covers pre-contractual performance."*

41. In the present case, it is important to remember that the Architectural Issue, which was the only matter apparently left unagreed between the parties, merely concerns which of two Standard Form Contracts should be used to define the full architectural and structural design services to be provided by Haswell. This reference is made in Clause 22 of Schedule 1 to the Consultancy Agreement. By 7 June 2002, Haswell had already agreed Schedule 1 and Schedule 2 (terms of payment) with the exception of Clause 22 in Schedule 1. Thus there was no dispute that Haswell had been appointed by Costain to carry out the services described in Schedule 1 and that Haswell was in fact performing those services and being paid for them under the terms of

payment contained in Schedule 2. Thus the dispute in question was a narrow one which centred on the description rather than the nature or extent, of the architectural services to be provided.

42. This is made clear from the table forming part of Costain's closing written submission which sets out, in tabular form, a comparison of the relevant provisions in the two competing RIBA Standard Forms and which shows where the differences between them lay. The substance of this table was put by Miss Rachel Ansell, Counsel for Costain, in cross-examination by video link to Brisbane, Australia where Mr. Steven Page now is living. A consideration of that evidence and of the table produced from it leads to the following conclusion set out in Costain's closing written submission at paragraph 41:

> "*The comparison of the "competing" RIBA Schedules makes it clear that Haswell had in fact agreed to provide all of the services listed in the RIBA SFA/92 Design and Build Form either because (i) the services were listed in the schedule to the RIBA SFA/92 Form which Haswell was proposing to use; or (ii) Haswell had already agreed to provide the services by agreeing the other terms of Schedule 1; or (iii) the services formed a necessary part of the services Haswell had already agreed to provide*".

I accept that submission and it follows that the disagreement between the parties centring on which standard form to use was more apparent than real and a careful analysis shows that, in substance, Haswell was agreeing to provide all the architectural services which Costain required notwithstanding the disagreement as to the document providing the description of those services. It follows and I so find that, at the latest by 3 October 2002, Haswell had in fact agreed all the essential terms of the proposed Consultancy Agreement even though both parties thought at the time that there remained an outstanding disagreement viz. which should be the correct source document to be referred to in Clause 22 of Schedule 1.

43. Alternatively I find that Haswell's conduct in continuing to provide all the services required under the Consultancy Agreement until it was concluded and invoicing Costain and being paid for those services on the basis of the terms of payment contained within Schedule 2 together with a complete absence of protest to the effect that there was no binding agreement between the parties, constitutes conduct from which, looked at objectively, the Court should conclude that Haswell had accepted the whole of the Consultancy Agreement including Clause 22 of Schedule 1 as proffered by Costain. This conduct was regularly affirmed by Mr. Andrew Johnson on the part of Haswell who, when he was frequently reminded by Mr. Hardingham that Haswell had still not signed and returned the Consultancy Agreement said that he would get it done or that he would sort it out as testified by Mr. Hardingham. Mr. Hardingham maintained the accuracy of this evidence under persistent cross-examination and I accept it. Mr. Johnson was not called as a witness by Haswell to contradict this evidence which was contained in Mr. Hardingham's witness statement. Miss Jefford QC for Haswell argues that it was not until Costain served its written Opening shortly before the commencement of the trial that, for the first time, Costain argued that, by the statements, Mr. Johnson had expressly accepted the last remaining term outstanding under the Contract thereby binding Haswell. In those circumstances, it is argued, that there was no reason to suppose that Mr. Johnson's evidence would be required. Whilst that submission is factually correct, I cannot accept its conclusion. At the time Costain's pleaded case was that Haswell had accepted the terms of the Consultancy Agreement by conduct. The evidence given by Mr. Hardingham of Mr. Johnson's conduct would plainly be advanced in support of that argument. In my judgment, it was a sufficiently important

allegation for Haswell to need to rebut it if possible. The only witness who could do so was Mr. Johnson yet he did not serve a witness statement. In my judgment Mr. Johnson's absence in these circumstances is corroborative of the substance and accuracy of Mr. Hardingham's evidence.

44. Finally, and if it were necessary to do so, I would be prepared to hold that even if the parties did not agree on the source document from which the description of the architectural services to be provided by Haswell was to be taken, that failure was in relation to the agreement of a term which was not essential for the proper functioning of the agreement as the parties intended. The analysis of the similarities between the descriptions of the architectural services contained within the two source documents carried out on behalf of Costain demonstrates clearly that there is very little difference between the two. Equally, the fact is that Haswell happily carried out the architectural services to their conclusion without, so far as I am aware, any dispute arising over them. Certainly no fundamental or even significant difference in the effect of the different terminology used in the two source documents has been asserted on behalf of Haswell. In such circumstances I would be prepared to hold, if it were necessary, that the Consultancy Agreement was perfectly workable and effective without the relevant source document being identified.

Conclusion

45. For these reasons I am satisfied that by 3 October 2002 there was a binding contract concluded between the parties in the terms of the Consultancy Agreement sent by Costain to Haswell on 22 July 2002. That Agreement had in fact been accepted as to the entirety of its terms by Haswell in the exchange of correspondence and emails which had taken place between them. Alternatively it was accepted by Haswell's conduct in continuing with and completing the Works without dissent and by Mr. Andrew Johnson confirming that he would get the Agreement signed on behalf of Haswell. Finally, if it were necessary, I would hold that if there were any disagreements between the parties as to the particular RIBA Standard Form to be referred to for a description of the architectural services to be provided by Haswell, then that disagreement concerned a term which was not essential for the formation and execution of a binding agreement.

THE CONSULTANCY AGREEMENT

46. Originally Costain's case against Haswell was based upon an alleged breach of Clause 7.2 of the Consultancy Agreement. By way of a late amendment, made in January 2009, Costain added reliance upon Clause 7.4 in addition to Clause 7.2. Costain alleges that, under Clause 7.4, Haswell's liability is strict or absolute i.e. liability can be established for breach without having to prove the absence of reasonable professional skill and care. This distinction becomes highly material in this case and gives rise to three questions of contractual construction raised by Haswell. These questions are:-

    (i) Whether Clause 7.4 creates an obligation of strict liability;

    (ii) Whether the surcharge mound which Haswell designed forms part of the Works to which Clause 7.4 applies;

    (iii) If so, whether the surcharge mound was constructed in accordance with Haswell's design.

47. Under the Consultancy Agreement Costain engaged Haswell to provide certain professional services as set out in Schedule 1. These services were to be provided during Phase 1 (the Tender Phase) and then during Phase 2 (the Design and Construction Phase) of the works which were to be executed by Costain under the Main Contract with UU. That Contract was based on the General Conditions of Contract for Building and Civil Engineering GC/Works/1 (Edition 3), Single Stage Design and Build. Under it Costain was required to design and then to build the works in accordance with the requirements of UU. UU's requirements were set out in many technical documents, some of which are not before the Court, including the Design Statement dated February 2002. Clause 2.3 of the Design Statement provides, in part, as follows:-

> *"2.3 Principal Items*
>
> *As part of the Contract Documents, a conceptual design and a Performance Specification have been provided indicating the requirements to be fulfilled by the CONTRACTOR as part of this Contract.*
>
> *The principal items of the scope of works under this Contract are described below. The description is not exhaustive and the full scope of work under the Contract is that defined or implied by the Contract Documentation as a whole.*
>
> *The CONTRACTOR shall have satisfied himself at tender stage as to the suitability of the conceptual design provided to meet the required performance parameters. He shall have indicated any and all areas of concern at the tender stage, as he is required to take responsibility for ensuring that the constructed works would meet the requirements of the performance parameters and specification given in the Contract.*
>
> *The CONTRACTOR shall develop the design to a fully detailed state that will allow construction to proceed, producing plant capable of meeting the performance requirements stipulated."*

48. The key performance requirements stipulated in the Design Statement which are relevant to this case concern permitted tolerances for settlement of the foundations of the buildings after their completion. This topic is dealt with generally under Clause 4.11 of the Design Statement as follows:-

> *"4.11 Civil (General)*
>
> *Unless stated otherwise the following general civil design criteria shall apply to the WORKS:-*
> *…*
>
> *Settlement*

The CONTRACTOR shall ensure that all pipework, ducts and other equipment which enters or leaves a structure or slab shall have sufficient flexibility to accommodate differential settlement.

Overall and differential settlement shall not exceed 15mm."

In relation to foundation design the following specification is provided:-

"12.14(N) Foundation Design

3. *All foundations and base slabs are to be designed by the CONTRACTOR.*

4. *Total and differential settlements of foundations ad base slabs shall not exceed 25mm and 10mm respectively."*

It is common ground that these settlement tolerances are tight and are necessary because of the importance of preserving the integrity of the major pipework which connects the various buildings of the water treatment works.

49. In broad terms, during the Tender Phase Haswell was to study all the information about the works and the site provided and to prepare designs and calculations and specifications etc. in order to enable Costain to submit a satisfactory tender for the works. During the design and construction phase Haswell were to continue with the services provided in the Tender Phase and to produce detailed architectural and structural designs for the works and to produce such drawings or other documents as were necessary as well as to inspect the works during their construction and provide the usual services which a professional consultant would provide in a project of this sort.

50. The terms of the Consultancy Agreement which are of particular relevance to the contractual issues raised are the following:-

"4. <u>The Contract</u>

4.1 The Consultant shall be provided with a copy of (a) the Tender Documents; and (b) upon award of the Contract Costain, the Contract excluding the rates and prices; and shall be deemed to have full knowledge thereof.

4.2 The Consultant shall so execute and complete the Services that no act or omission of the Consultant shall constitute, cause or contribute to any breach by Costain of its obligations under the Contract and the Consultant shall assume and perform in relation to the Services hereunder all the obligations and liabilities of Costain under the Contract as if they were expressly set out herein."

…

7.0 <u>Consultant's Warranties</u>

The Consultant warrants that:

7.1 …

7.2 In the provision of the Services the Consultant shall exercise all reasonable professional skill, care and diligence.

7.3 …

7.4 Any part of the works designed pursuant to this Agreement if constructed in accordance with such design, shall meet the requirements described in the Specification or reasonably to be inferred from the Tender Documents or the Contract or the written requirements of Costain and designed in accordance with good up to date engineering practice and with all applicable laws, by laws, codes or mandatory regulations and in all respects with the requirements of the Contract.

7.5 No material generally known to be deleterious shall be specified for use in the Works and that all materials specified therefor conform to current British Standards Specifications and Codes of Practice."

51. I shall now consider the three questions raised by Haswell as to the construction and effect of Clause 7.4.

Whether Clause 7.4 creates an obligation of strict liability

52. Haswell raises two preliminary points. Firstly, it is said that, if Clause 7.4 did indeed impose an obligation of strict liability, then it is surprising, to say the least, that Costain and its legal advisers who had been engaged on this dispute for over 6 years, should have overlooked this fact until January 2009. This, it is said, is an indication that the construction is incorrect. I can deal with this argument shortly. Simply because an argument has occurred to a party late in the day does not necessarily mean that the argument is a bad one. There are many reasons why legal points, which may appear obvious to one lawyer, escape another competent lawyer. There are even cases where the true construction of a contract escapes both parties until it is identified by the Judge trying the case. Accordingly, I place little if any weight on this argument.

53. The second preliminary point is that, in the context of Clause 7 as a whole, Clause 7.4 should be read as being subject to Clause 7.2 so that no additional obligation, whether strict or otherwise, is being imposed in addition to the usual duty of professional skill and care imposed under Clause 7.2. Again I can deal with the argument shortly. It seems to me quite plain that Clause 7.4 is adding something different to Clause 7.2, otherwise it would not need to be there. In my view, Clause 7.2 is a general provision relating to all the services provided by the Consultant as a professional man. That would include his services of preparation, supervision, advising, testing and preparation of supporting documentation. By contrast, Clause 7.4 is limited to one particular part of the Consultant's obligations, vis. the design of the permanent works. Clause 7.4 only imposes an obligation on Haswell in relation to any part of the works which are constructed in accordance with the design produced by Haswell. This is a limited, albeit highly

important, part of the general services to be provided by Haswell. I can see no reason why this critical activity should not be singled out in the Contract for special treatment.

54. Having disposed of those preliminary matters, I turn to construe Clause 7.4 in the context of the Consultancy Agreement as a whole. Clause 7 is headed "Consultant's Warranties" and, under it, the Consultant is required to give seven specific warranties. The wording of Clause 7.4 is expressed in mandatory terms and, in my opinion, imposes an obligation of strict liability in contrast with Clause 7.2. The words *"…shall meet the requirements described in the Specification…"* are quite clear as are the concluding words in this clause *"…designed in accordance with good up to date engineering practice and with all applicable laws, byelaws, codes or mandatory regulations and in all respects with the requirements of the Contract."* In addition such a strict obligation or performance requirement is also imposed in my view, by Clauses 7.1 and 7.5.

55. More generally, whilst it is true that usually a professional man in the field of construction only undertakes an obligation to this client of the exercise of all reasonable professional skill and care, it is perfectly normal, in any given case, for such a professional man to give express warranties which impose strict liability or a performance obligation such as that the finished building will be reasonably fit for a specified purpose. There is nothing in principle wrong or unusual in finding such provisions in professional engagements and subject to the arguments to the contrary raised on behalf of Haswell, I consider that Clause 7.4 fits into this category.

56. The principal argument raised by Haswell against this conclusion is that, in light of the terms of the Main Contract, there is no good commercial reason why Costain should wish to impose strict liability on Haswell in relation to its design where, under the Main Contract, Costain is under no such obligation to UU. It is true that, under Clause 10 of the Main Contract which deals with Costain's obligation to carry out the design, that obligation is framed as a duty to exercise the degree of skill and care to be expected of a suitably qualified professional designer. That, of course, is the duty to exercise all reasonable professional skill and care. Whilst this point is no doubt correct, in my judgment, it doesn't carry the argument. Firstly the argument depends on Clause 10 of the General Conditions of Contract governing the Main Contract but the Articles of Agreement themselves, forming part of the Main Contract, have not been provided to the Court. Accordingly it is not clear from such contractual documents as have been provided, what obligation was imposed on Costain in respect of the construction of the works themselves, as opposed to their design. It would, in my judgment, be surprising if Costain were under anything other than a strict obligation to comply with the Specification in relation to the actual construction of the works. This would be perfectly normal in the case of a construction contract. On Haswell's argument Costain was only under an obligation to exercise reasonable care and skill in respect of both the design and construction of the works. I doubt this but make no finding on it in the absence of the full documentation, including the Articles of Agreement, of the Main Contract. For my part I find it difficult to conceive that a sophisticated employer like UU would be prepared to accept that the strict settlement tolerances might be exceeded without any recourse against Costain provided that Costain had exercised reasonable skill and care in constructing the works. That would mean that UU was accepting a significant risk that the works might fail with only limited recourse against Costain. However, even if I am wrong about that, I do not consider that, even if Costain had such a limited liability under the Main Contract, it necessarily follows that it only sought to impose a similar liability on Haswell. Whilst the Consultancy Agreement no doubt needs to be construed against the background of the

matter which includes the existence and terms of the Main Contract, these two contracts are not directly or expressly linked in any way and are certainly not *"back to back."* Thus, it seems to me, that what I consider to be the plain wording of Clause 7.4 of the Consultancy Agreement must prevail over any apparent lack of conformity between the two contracts in this respect.

57. Haswell also argues that, on the basis that Costain's obligations in respect of the construction of the works was only one to exercise reasonable skill and care, that, on that basis, Clause 7.4 should be construed to give rise to a similar obligation since Haswell's design would meet the requirements of the Main Contract if it was executed with reasonable skill and care. It is said that this follows from the wording in Clause 7.4 that the designed works must comply *"….in all respects with the requirements of the Contract."*

58. Again I am not satisfied that Haswell has demonstrated that Costain's obligations in respect of the construction of the works under the Main Contract was limited to one to exercise reasonable skill and care. I find it difficult to see the commercial sense or practicality in laying down strict tolerances as regards settlement in the Main Contract specifications but then to only require the Contractor to use reasonable skill and care to achieve those tolerances. That, it seems to me, would be to seriously undermine the purpose and intended effect of the Main Contract.

59. For these reasons I conclude that Haswell's obligation under Clause 7.4 of the Consultancy Agreement is one of strict liability to, in effect, ensure that, if any part of the works is constructed in accordance with Haswell's design, that part shall meet the requirements described in the Specification including the requirements in relation to permitted settlement tolerances.

Whether the surcharge mound designed by Haswell falls within Clause 7.4

60. Costain submits that the surcharge mound designed by Haswell falls within Clause 7.4 since it was designed to overload the ground upon which the foundations of the IW and RGF were to be built so that once built, those foundations would only settle within the permitted tolerances. The surcharge mound itself was not to be part of the permanent works since it would be removed before the foundations were constructed.

61. It is Haswell's submission that these circumstances do not fall within the ambit of Clause 7.4 since, as events turned out, the foundations actually built by Costain as part of the permanent works under the IW and RGF were piled foundations which were entirely satisfactory. The originally proposed foundations were not constructed so, even if Haswell's design was defective, no part of the Works was *"…constructed in accordance with such design…"* so that Clause 7.4, by its very terms, does not apply. To put it another way, Ms. Jefford QC submits that, were it otherwise, Haswell would, in effect, be giving two separate contractual warranties, one in respect of the piled foundations which were constructed and another in respect of the original foundations which were not instructed. This cannot, it is submitted, have been the intention of the parties.

62. In my judgment, Haswell's argument on this point is correct. The purpose of Clause 7.4 is to give Costain contractual protection in respect of any liabilities which it may have to UU under the Main Contract in respect of the compliance of the permanent works with UU's specification. That protection is only necessary in respect of the permanent works, i.e. the works which were

constructed and completed and handed over by Costain. It is only those works which had to comply with the tight foundation settlement tolerances. This is the situation which Clause 7.4 addresses. By its terms it does not address the situation which has arisen in this case namely where an original design was aborted and replaced with a different design which was ultimately constructed. The original design whether defective or not, did not become part of the permanent works and so, does not, in my view, fall within the ambit of Clause 7.4. Of course it still falls within the ambit of Clause 7.2 which is an entirely different matter.

Conclusion

63. For these reasons I have concluded that Clause 7.4 of the Consultancy Agreement does impose an obligation of strict liability upon Haswell in respect of its design if any part of the works based on such design, is constructed by Costain to form part of the permanent works. But Clause 7.4 does not apply to the surcharge works designed by Haswell in this case since that design was abandoned and never incorporated into the permanent works. It was not the intention of the parties that, potentially, Haswell would be under a strict liability obligation in respect of several successive designs but only in respect of the final design which was incorporated into the permanent works by Costain.

Whether the surcharge mound was constructed in accordance with Haswell's design

64. This argument only arises if Haswell's previous arguments under Clause 7.4 fail. I have found that Haswell's second argument succeeds so that it is unnecessary to consider this further point raised by Haswell.

The date for the commencement of compliance with the settlement criteria

65. There is a small issue between the parties as to the correct starting point for the measurement of the settlement of the structures in order to see that it complied with the specified settlement tolerances in the Contract. Costain's case is that such measurement should begin at the commencement of commissioning of the structures when they were loaded with water. It is Haswell's case that the measurement should begin after commissioning had been completed.

66. In the memorandum dated 22 January 2002 from Mr. Marsh to Mr. Page, the following is specified:

> "*3.* ***Compliance Criteria***
>
> *The design and implementation of this surcharge solution is based upon the specified criteria in the Tender Documents being applied with the baseline point taken as the commissioning of the structure. All settlements that have occurred up until that point are considered to be construction settlements and are out with these criteria*".

That passage was discussed between the parties at a meeting and was accepted by Costain. The question remains, however, how it is to be interpreted.

67. It is Costain's case that the settlement should begin to be measured at the commencement of the commissioning of the structures since, at that point, they are loaded with water. This activity obviously adds significant loading to the existing structures and is the condition for which the structures and the specified settlement tolerances were designed. It would make no

sense, so Costain argues, for the settlement first to be measured after commissioning had been completed since, by then, depending on how long the commissioning process took, considerable settlements might have already occurred which should be taken into account since it would have a potentially damaging effect on the pipe work running between the structures.

68. On the other hand, Haswell argues that the measurements should only begin to be taken after the commissioning of the structures had been completed and that is what, it is submitted, Mr. Marsh meant in his memorandum.

69. In my judgment Costain's interpretation is to be preferred in this case. Since the specified settlement tolerances are tight and are particularly tight in relation to differential settlement, and since such settlement would be likely to take place with the loading of the structures by being filled with water, it makes little sense to postpone the commencement of measurement until the commissioning process had been concluded. Depending upon how long that process lasted, it would mean that potentially significant settlement which actually occurred would be excluded from consideration when deciding whether or not the specified tolerances had been exceeded. This would make no sense practically or commercially and would certainly not give the Owner, UU, the protection from damage caused by undue settlement which the Main Contract plainly required. For these reasons I conclude that the measurement of settlements in the structures, in order to decide whether the specified tolerances had been exceeded, should begin at the commencement of the commissioning of the structures.

THE HASWELL DESIGN

70. The decision to recommend the use of a ground treatment scheme and the design of that scheme were the responsibility of Mr. Andrew Marsh, an engineering geologist and geotechnical engineer who had 14 years experience as a geotechnical engineer prior to joining Haswell in 2001. Notwithstanding this experience, Mr. Marsh had never previously been involved in the design of a ground treatment scheme. He worked under the supervision of Christine Wright, a structural engineer with Haswell. Mr. Marsh was tasked with making recommendations for the design of the foundations of no less than 18 structures at the Water Treatment Works, of which this case concerns only two structures. Notwithstanding the size of this task Mr. Marsh seems to have operated on his own and without consulting the more experienced senior engineers in the Haswell organisation.

71. The principal tool which Mr. Marsh used for this purpose was the Norwest Holst Report dated 17 October 2001. That Report, running to about 450 pages, contains the data derived from the Site Investigation as a whole which included a total of 20 cable percussive boreholes as well as rotary drilling, trial pits and piezometers. Of this mass of material the borehole logs and the associated laboratory tests have been the main centre of attention in the expert evidence. Of the 20 boreholes in the Norwest Holst Report, 6 of them vis. BHL8 – 13 inclusive are of the greatest relevance since they were the ones placed under or very close to the sites of the RGF and IW. Fortunately the relevant borehole logs have been agreed between the experts whereas the key issue of their proper interpretation is probably the single most important expert issue in this case.

72. Based on the Norwest Holst Report, Mr. Marsh drew up his findings and recommendations in a memorandum dated 12 December 2001 sent to Christine Wright under the heading *"Preliminary Geotechnical Assessments"*. Sent with this 5 page memorandum were sheets entitled

"Preliminary Geotechnical Assessment Sheets" (PGAS) in respect of each of these structures to be constructed. These documents were passed on to Mr. Bell at Costain by Haswell on 20 December 2001.

73. The key parts of these documents are as follows:-

(i) In paragraph 1 of the Memorandum appears the following important paragraph:-

> *"Each individual sheet provided should be read in conjunction with these accompanying notes and guidance. It should be understood that these are Preliminary Geotechnical Assessments for use by the Design and Project Team to support Costain in the Design and Build Tender Submissions. Should Costain be successful and retain our services, each structure and assessment will need to be revisited and reviewed in more detail as part of the detailed design process."*

(ii) Under the heading *"Lostock-General Considerations"* the following appears:-

> *"The water treatment works in the south of the site are to be constructed on between 8 and 10m of alluvium. The alluvium is not consistent in strength and type and can generally be divided into two types:*
>
> *Type 1 – very loose and loose granular alluvium, this material is locally sandy silt or silt.*
>
> *Type 2 – very soft clay.*
>
> *Type 1 materials are present throughout the site, however, the soft clays are only present as a layer within Type 1 in the western part of the site.*
>
> *In general terms, the materials are not suitable as founding medium for heavily loaded or deep structures. Some structures can be formed in the eastern site by conventional means after ground improvement by surcharges. However, the majority of the structures will need either thickened mass concrete floors or piles to support the loads.*
>
> *…*
>
> *Ground improvement by surcharging is proposed for the structures in the east of the site. There the foundations are predominantly in the granular alluvium. Surcharging is proposed to "take out" the significant element of the settlement prior to construction in order that conventional "shallow" foundations can be employed. A series of surcharge curves are enclosed as a guide to time and height of surcharge requirements. The final duration of any surcharge load will be based on on-site performance and monitoring rather than specific time increments."*

NOTE: The RGF and IW were located in the east of the site, the area described as suitable for surcharging treatment. The reference to surcharge curves being enclosed was incorrect as they were not enclosed. In fact no such curves were ever supplied by Haswell, despite several requests from Costain.

(iii) Under the heading *"Site Investigation"* it is stated:-

> *"We understand that Costain are considering making a general allowance, particularly for Lostock, for further site investigations should they be successful. We will be pleased to provide some guidance and direction on the requirements of any future site investigation should the Client desire."*

(iv) The PGAS relating to the IW provided as follows:-

- The top stratum of soil down to about 9m below ground level was described as follows:-

  "Alluvium. Predominantly loose, locally medium dense, clayey and silty SAND with some layers of medium dense, gravely SAND and stiff CLAY."

- Under the heading *"Foundation Assessment"* the following were stated:-

  "The actual alluvial soils are very loose and loose granular alluvium with SPT "N" values typically vary from 2 to 9 in the upper 8-9m. These strata have acceptable varied capacity for the structure. However, a maximum allowable bearing pressures, settlements will be in excess of 100mm. For the anticipated loads of circa 100KPa, the settlements are considered to be unacceptable. Subsequently either the loads needs to be transferred to more suitable stratum (and create a depth) or some form of ground improvement is required.

  It is considered that, given the granular nature of the strata, surcharging of the ground prior to construction will improve the properties of the formation to enable conventional structure to take place. This surcharging will pre-load the ground and therefore take out the significant settlements. A surcharge load of circa 70KPa (circa 3-4m) for a duration of 6-8 weeks would be satisfactory.

  During construction and positioning of the structure it will be possible to provide controlled loading conditions by filling the cells uniformly. This will control the final settlements that will appear without causing distress to the structure. The settlements are expected to be relatively immediate.

  The controlled programme of surcharging monitoring and construction should be prepared to optimise the rate of construction whilst maintaining control on the rate and magnitude of settlement."

- Under the heading *"Concluding Remarks"* it is stated:

"It should be appreciated that the information provided in this Preliminary Geotechnical Assessment Sheet is of a preliminary nature and should not be considered as comprehensive or could be used in detailed design. For any detailed design may follow a more comprehensive Geotechnical Assessment will need to be provided, taking cognisance of detailed structural form, loads, sensitivity and other relevant information."

(v) The PGAS for the RGF is, to all intents and purposes identical to that for the IW (above) save for the description of the top stratum of soil down to about 9m which is described as follows:-

"Alluvium. Inter-bedded firm, locally soft, silty CLAY with very loose and loose locally silty SAND with local SILT horizons."

74. The above documents contain the basic design for the ground treatment beneath the RGF and IW which was ultimately constructed by Costain.

75. On 22 January 2002, after Costain has submitted its tender to UU, Mr. Marsh sent a memorandum to Steve Page of Haswell headed *"Post Tender Geotechnical Design Matters"*. This document set out in some detail the procedure for placing the fill in order to create the surcharge mound up to 4m in height and also described the specification for the measuring equipment to be incorporated into the mound. Under the heading *"Surcharging Proposals"* the following is stated:-

"Surcharging is proposed for the following buildings/structures at Lostock in order to build out the majority of the settlement beneath the structure is built out (sic) *prior to construction. This will enable conventional foundations to be adopted rather than potentially more expensive solutions.*

Inlet Works
Rapid Gravity Filters
Lamella Building
Administration Building."

76. On about 15 March 2002 Mr. Marsh was transferred to other duties within Haswell and had no further involvement with the Project until June 2002. In his absence his responsibilities were passed to Mr. David Ouston, a young Geotechnical Engineer who had obtained his Masters Degree in Applied Geology in 1997 and who began working with Haswell in May 1997. However he left Haswell in March 2001 and rejoined them in January 2002. Mr. Ouston remained responsible for the foundation designs of this project until 13 July 2002 when he was off work due to an unfortunate injury sustained on the cricket field.

77. On 31 May 2002 Mr. Chris Jew, a Civil Engineer with Haswell who acted as liaison contact with Costain, sent to Mr. Bell of Costain a memo drafted by Mr. Ouston giving further details of the surcharging procedure to be adopted for the IW and RGF. In that procedure Mr. Ouston recommended, for the first time, that a 500mm thick granular drainage blanket (later reduced to 300mm thick) should be laid on the ground before the surcharge mound was constructed over it. The purpose of this blanket was to assist rapid drainage of groundwater under the load from the mound. The memo also gave greater detail as to the monitoring equipment to be provided in the mound and of the method to be used for taking measurements of the settlement once the mound had been completed.

78. In mid May 2002 the further site investigation recommended by Haswell was carried out by Costain Geotechnical Services (CGS).

79. On 28 June 2002 work commenced on laying the drainage blanket and beginning to construct the surcharge mound over it. This work continued until 28 July 2002 when the mound had reached a height of 4m.

80. On 26 July 2002 CGS produced its draft Report of the Further Site Investigation.

The Ground Treatment Scheme

81. At this stage it is necessary to give a general description of the surcharging procedure and an explanation as to why it is used in certain circumstances. The surcharging procedure simply involves placing a load on the ground where foundations are later to be constructed in order to cause the ground to settle by a pre-determined amount. This settlement will stiffen and strengthen the ground so that, thereafter, conventional foundations can be constructed where, otherwise, they could not. In short, surcharging improves the bearing capacity of the ground so that more expensive foundations, such as piled foundations to a greater depth, are rendered unnecessary. Thus surcharging with the use of conventional foundations is economically advantageous to the Contractor.

82. There are two types of surcharging which it is important to distinquish in this case. The first type of surcharging is known as *"pre-loading"* which involves applying a load to the ground broadly equivalent to the load which will ultimately be imposed by the relevant structure once it has been completed. Thus pre-loading involves placing this same load as would be applied by the building before construction of the building commences. The other form of surcharging is known as *"surcharging"* which, as its name suggests, involves applying a load to the ground greater and, sometimes, considerably greater, than the load ultimately to be imposed by the completed structure. The purpose of surcharging is to *"squeeze out"* the great majority of settlement which will occur when the ground is loaded by the structure including, crucially, long term settlement or *"creep"* which will continue, at a diminishing rate, over a very long period measured in decades. This is one advantage that surcharging has over pre-loading which will not squeeze out any appreciable amount of creep.

83. Since this ground treatment, by definition takes place before construction of the foundations of the structure is commenced, it necessarily delays the start of construction. Thus it needs to be built into the Contractor's programme so as not to delay completion of the works unnecessarily. This means, under normal commercial conditions that the ground treatment mound cannot be left in situ for too long otherwise unacceptably expensive delays will occur. It follows that, for

this ground treatment to be effective, it usually needs to squeeze out the necessary settlement from the ground in a relatively short period measured in weeks or months, in this case the period given was 6-8 weeks. This criterion leads on to a consideration of the types of subsoil which are suitable for this type of ground treatment.

84. For this purpose soils can broadly be divided into two categories viz. coarse or granular soils on the one hand and fine or cohesive soils on the other. The qualities of granular soils such as sand are that these soils are relatively highly permeable and not compressible. This means that when a load is applied to such soil, it will settle rapidly since the water contained within the soil mass will be expelled easily and rapidly due to the coarse nature of the soil. Soils of this type are generally, all other things being equal, suitable for this form of ground treatment. On the other hand fine soils such as clay have the opposite characteristics i.e. they are generally impermeable and compressible. This means that when a load is applied to a clay, it will take much longer for the water within the soil mass to be expelled with the result that, in the ordinary course, settlements under load will continue much longer than is the case with coarse soils.

85. It follows from this description that the rate of consolidation of different types of soil will vary when subjected to the same load. In the case of coarse soils one expects consolidation to take place rapidly and to tail off relatively quickly, whereas in the case of fine soils, the reverse is the case.

The Experts

86. In this case the geotechnical experts have diametrically opposed views upon the key issue as to whether or not, on this site, it was appropriate for Haswell to recommend ground treatment by pre-loading. That difference of view starts with very different interpretations of the two Site Investigation Reports available and continues in relation to the desirability of using a pre-loading scheme.

87. Both experts are highly experienced geotechnical engineers. Costain's expert is Dr. D.W. Hight BSc, MSc , PhD, DIC, Ch, MREng, MICE. Dr. Hight has been visiting professor at Imperial College London from 1993 to the present time and was the Chairman of the International Society's Technical Committee on Soil Improvement from 1994 to 2001. Dr. Hight has undertaken several applied research contracts, including studies of anchored earth, pile capacity in sand and embankments on soft clay. He has carried out a review of soil sampling and laboratory testing for the Science and Engineer Research Counsel. Dr. Hight has been published widely on the subjects of soil behaviour, off-shore geotechnics, soil sampling, laboratory testing etc. and, in 1998, he delivered the British Geotechnical Society's 1998 Rankine Lecture which he has, by invitation given at 26 venues worldwide.

88. Haswell's expert is Mr. Leonard Threadgold BEng (Hons) Civil Engineering, MEng in Soil Mechanics, Chartered Engineer, MICE, Fellow of the Geological Society. Mr. Threadgold is a member of the Geotechnical Society and served for three years on a committee of the British Geotechnical Society. Since 1979 he has been successively Chief Engineer, Managing Director and now Chairman of Geotechnics Ltd, a company specialising in site investigation and design of major embankments and other foundation sites. His experience in ground investigations and in foundation design of many different types spans some 47 years.

ALLEGATIONS OF NEGLIGENCE

89. Costain has made a number of allegations against Haswell in respect of the professional services which it carried out. These have been divided into two periods viz pre-tender and post-tender.

Allegations during the Pre-Tender Period

90. During this period Costain makes a number of stringent criticisms of the way Mr. Marsh went about his task which, it is submitted, indicate that he was not acting with the degree of care and skill to be expected of a reasonably competent Geotechnical Engineer. Such criticisms include the following:

(i) *That he only carried out two of the six steps which would be expected of a competent engineer in producing a design;*

(ii) *That, although Mr. Marsh drew up and relied upon detailed calculations contained on ten pages of paper, these pages have gone missing so that only three remain;*

(iii) *Despite many requests from Costain, Mr. Marsh never provided the time/settlement curves which he had promised;*

(iv) *In his original design there was no reference to a drainage blanket beneath the surcharge mound which was later found to be necessary.*

91. Whilst there is evidence to support all these criticisms, I do not feel it necessary to make findings on them. This is because these criticisms, even if made out as instances of lack of due care and skill, are not causative of the loss which Costain suffered. They might indicate the actions of an inexperienced engineer but do not inextricably lead to the production of a faulty design. Accordingly, in this judgment, I propose to concentrate upon the fundamental and serious criticisms of Haswell's design which can be encompassed within the following two propositions:-

(i) *Haswell, through Mr. Marsh, misinterpreted the Norwest Holst Report and reached erroneous conclusions as to the nature and characteristics of the subsoil expressed, in shorthand as being "predominantly granular".*

(ii) *Based upon this misinterpretation but, in any event, specified a form of ground treatment viz pre-loading which was, in the circumstances, inappropriate and not likely to be successful.*

Costain alleges that, in so acting, Mr. Marsh fell below the standard to be expected of a reasonably competent Geotechnical Engineer.

92. There is a great deal of agreement between the experts both as to general matters of geo-technical engineering and even as to certain interpretations of the site investigation data. For example it is common ground that:-

(i) The two most important values of the sub-soil for the purpose of a ground treatment scheme of this sort are its permeability and compressibility. This is because these

factors determine the consolidation co-efficient (Cv) i.e. the rate at which consolidation will occur.

(ii) It is also common ground that fine materials, e.g. silts and clays are less permeable than coarse materials, e.g. sands and gravels and also that fine materials are more compressible than coarse materials so that the more fine materials there are in a soil, the lower the consolidation co-efficient will be of that soil, i.e. consolidation will be slower;

(iii) A relatively small amount of clay or silt, e.g. five to ten percent can have a significant effect on the permeability of the soil. It follows that there is likely to be more creep (long term consolidation) in soils which contain even small amounts of clay or silt;

(iv) In relation to this site itself it was common ground that:-

(a) The composition of the soils shown in the borehole logs was variable vertically (as shown in each borehole log); and

(b) Laterally (as shown by a comparison between different borehole logs at the same depth);

(c) It is clear from the Particle Size Distribution (PSD) laboratory tests that the alluvial soils shown in the borehole logs contained quantities of silt and clay which increased with depth.

93. The presence of silts or clays in permeable soil such as sand, even in small quantities, will significantly increase the impermeability of the sand. Dr. Hight produced Figure 1.3.3 to his report being a figure taken from a 1994 publication of which he was a co-author which contained a graph demonstrating this effect. This graph shows that even 5% of silt or clay by weight will increase the permeability from 10 to the minus 5 to 10 to the minus 7. If the silt/clay content is increased to 20%, the permeability falls to 10 to the minus 9 or below. Dr. Hight said that this equates to increases in impermeabilty of 3 or 4 times.

94. The relevant Code of Practice which governs this branch of soil mechanics is BS5930: 1999, "Code of Practice for Site Investigations" which was considered in detail by both experts. In Section 41.1 that Code of Practice describes *"coarse soils"* as being gravels and sands, whereas *"fine soils"* are clays and silts. Soils are described as fine soils when they contain more than 35% clay and silt. Soils are described as coarse soils when they contain more than 65% sand and gravel. (Table 13). Sands which contain more than 5% of clay or soil can be described as fine soil depending on their assessed engineering behaviour. Silts and clays can be described as coarse material depending on their assessed engineering behaviour but, only if they contain more than 65% of sand or gravel. (Table at 41.4.4.5). (Emphasis added)

95. The agreed borehole schedule for borehole logs 8-13 (being those closest to or underneath RGF and IW) set out, in tabular form, the particle size distribution of the materials logged based on the PSD tests. On analysis of those schedules, it transpires that most of the layers of soil under the RGF and IW are shown to have a sand content of significantly less than 65% with the balance generally being made up of silts and/or clays in different combinations. On that basis Costain

argues that those soils could not properly be described as "coarse soils" which is the equivalent term for "granular" as used by Mr. Marsh. It was noticeable that when Mr. Threadgold was asked whether or not those soils should properly be described as "fine" he declined to answer the question. Costain submits that, had he answered, he would have been bound to agree with that description which flatly contradicts Mr. Marsh's description.

96. During the course of his evidence, Mr. Marsh produced a cross-section of the ground between borehole 8 (under the western part of the RGF) and borehole 12 (under the IW). This cross-section showed that, under borehole 8 there were two layers of sandy clay, one just beneath the surface and the second between about 5-8 metres below ground level. These sandy clay layers were above and below a generally sandy stratum. However, at borehole 12, these sandy clay layers had disappeared. Both Dr. Hight and Mr. Threadgold agreed in evidence that this cross-section accurately represented the picture revealed by these borehole logs.

97. Mr. Threadgold was asked about this cross-section in evidence and he agreed that the sandy clay layers would inhibit drainage of the subsoil vertically but he maintained that, under load, the water in the sandy clay would be expelled by horizontal drainage paths relatively rapidly. The following passage then took place:-

> *"Q The clay layers are going to be significant aren't they, in terms of determining the rates of consolidation in different areas of the site?*
>
> *A Yes they are, my Lord. But it depends from what to what. It will likely delay it substantially, but it depends to what it will reduce it as to whether or not it would be appropriate for schemes such as this, yes.*
>
> *Q It has got to be taken into account?*
>
> *A Absolutely."* (Day 10, page 47).

98. Costain rely upon this cross-section to demonstrate that it was inaccurate for Mr. Marsh to characterise the soils as being *"predominantly granular"* since it contained significant amounts of clays and silts which behave quite differently from granular material. It also demonstrates the considerable and material variability of the subsoil across the site with the western part of the site containing more fine material than the eastern. This, so it is suggested, is highly material when considering consolidation since the two areas are likely to consolidate at different rates and over different time periods. This, it is suggested, should have been taken into account by Mr. Marsh when deciding to recommend pre-loading.

99. A further indication of the variability of the subsoil according to Costain is provided by the N values recorded. N values are the values derived from Standard Penetration Tests (SPT) which measure the number of blows required to drive a metal cone into the ground. Low 'N' values mean that the cone penetrates the ground easily from which it can be inferred that the ground is relatively soft if it is a clay or silt and relatively loose if it is a sand or gravel. High 'N' values mean that the ground is relatively stiff/strong if it is a clay or silt and relatively dense if it is a sand or gravel. In this case the N values varied from 2 to 11 which indicates that, at depth, there was a significant variability in the stiffness/strength of the soil. For example, the 'N' values for the ground beneath the site of the RGF were generally lower than those beneath the IW

showing that the ground conditions below the western part of the RGF were significantly different from those under the IW, as was agreed by both experts.

100. Finally Costain submits that the recorded permeabilities in the soil derived from in-situ permeability tests at shallow depths in boreholes 10 and 13 were very low for material described as sand. Permeabilities of 10 to the minus 6 and 10 to the minus 8 were recorded whereas, in sand, one would expect permeabilities of 10 to the minus 4 or 10 to the minus 5. Since these are log figures, the differences are large. Given that, on this site, the silt and clay content increased with depth, the permeabilities of the soil would also be expected to decrease still further with depth. This would indicate to a competent engineer, that the soil would become increasingly impermeable and compressible at greater depths which would of course have significant effects on the factor of consolidation.

101. No in-situ impermeability tests had been carried out at lower levels so there were no results from which a reasonably competent engineer could come to the conclusion that the soils would consolidate rapidly like a granular soil. In fact, so Costain alleges, a competent engineer, when considering all the evidence, should have come to the opposite conclusion viz that, at lower levels, the subsoil would consolidate much more slowly than at shallower levels.

Summary

102. In summary it was Dr. Hight's opinion that a competent Geotechnical Engineer relying on the material contained within the Norwest Holst Report and exercising reasonable care and skill would not have concluded that the ground conditions were *"predominantly granular"* but rather that:-

(i) The alluvial soils comprised a relatively complex sequence which overall coarsens from the base to the top, changing from a sandy clay or clayey silt to a sandy silt to a silty sand.

(ii) The quantities of silt and clay increased with depth which meant that permeability decreased with depth and compressibility and creep of the soil increased. This meant that the co-efficient of consolidation would be significantly reduced.

(iii) The permeability of the upper layers of soil was relatively low and the permeabilities of the lower layers, which contained more clay and silt, were likely to be at least two and probably more orders of magnitude lower.

(iv) The presence of silts in the ground meant that the behaviour of the ground was less predictable than if it were sand or clay and there was a lack of established methods for predicting its performance.

(v) The upper layer of sandy clay and a lower layer of clay or silt would restrict vertical drainage.

(vi) There was significant vertical variability in the soils and although there was some lateral consistency of layers, lateral variations in stratigraphy occurred within the sites of the RGF and IW.

(vii) Overall, Dr. Hight said in evidence that he could not agree with Haswell's and Mr. Threadgold's simple classification of the ground conditions as being *"predominantly granular"*. Dr. Hight's evidence was that the ground was *"a multi-layer system that comprises materials which could be described as granular in the upper part and a lower part where the material is described as a sandy clay or a silty sand"*. No reasonably competent engineer, in his opinion, could conclude that the ground conditions were predominantly granular.

Pre-loading or Surcharging

103. The second major criticism of Haswell's design is that, on the available material from the Norwest Holst Report, neither a pre-loading nor a surcharging system should have been advised by Haswell but that the pre-loading system advised was the least satisfactory of the two options. It is common ground between the experts that the scheme designed by Mr. Marsh was a pre-loading scheme since the load to be applied of 70 Kpa on the cleared and levelled surface of the ground equated to the load to be imposed by the eventual structures of 100 Kpa at foundation depths. It is Dr. Hight's position that a competent Geotechnical Engineer would have concluded that pre-loading was simply not an option for ground improvement of this site whereas Mr. Threadgold maintained the position that pre-loading was an acceptable option provided it was carried out and monitored properly.

104. In summary Dr. Hight rejected pre-loading as an option for the following reasons:

(i) A competent engineer would have been concerned by the absence in the Norwest Holst Report of any information on the pre-consolidation pressure and its variation with depth, the compressibility of the soils in a normally and over consolidated state and the permeability of the lower layers which appear to contain compressible soils. In the absence of this information, Dr. Hight considered that a competent engineer should have advised his client that he did not have sufficient information to make a judgment as to whether or not pre-loading was a viable option.

(ii) A competent engineer ought properly to have recognised the need to bring the soils into an over-consolidated state (which could not be achieved by pre-loading) in order to increase reload stiffness and to reduce post-construction creep which were unlikely to be small in view of the presence of compressible clayey silts. Put another way, preloading (as opposed to surcharging) assumes post-construction creep will be low which is not an assumption which could be made in view of the presence of compressible clayey silts at depth.

(iii) There was a lack of precedent in the literature for preloading (as opposed to surcharging) on complex sequences of soils comprising essentially silts.

(iv) Whilst preloading can deal with lateral and vertical variations in compressibility, difficulties arise when the variations in stratigraphy lead to significant differences in permeability both laterally and vertically which was a feature of the ground conditions under the RGF and IW. This is because variations in the permeability of the soil will affect the time taken to achieve consolidation so that, in the same period of time, those parts of the site not containing compressible soils will consolidate more than other parts leading to differential settlement when the structure is completed.

(v) In a case such as the present, where the contract settlement criteria for the structures both absolutely and differentially, were agreed to be tight and where there was no data on the reload stiffness of the soil which can be achieved, and where pre-loading would not eliminate post-construction creep, preloading was simply not an appropriate solution to the particular characteristics of this site.

105. In his initial report Mr. Threadgold had supported the advice by Haswell that a preloading scheme (as opposed to a surcharge) was appropriate to this site. However, in evidence, Mr. Threadgold was taken to extracts from six different pieces of technical literature which supported the use of surcharging in preference to pre-loading. One of those references was to a publication in 2000 upon which Mr. Threadgold himself relied entitled *"Pre-compression Design for Secondary Settlement Reduction"* known, after one of its authors, as *"the Alonso Report"*. The key passage to which Mr. Threadgold was referred provides as follows:-

> *"As primary consolidation settlements take place rather quickly, they can be largely controlled by applying a preload over a limited period. The main design criteria therefore concerns secondary settlements. Laboratory and field data indicate clearly that over consolidating the soil, even in moderate amounts, significantly reduces the secondary compression rate. The performance of an unloading stage in the pre-load test provides crucial information in this regard. Therefore applying a pre-load surcharge larger than the final structure load is quite effective in controlling the magnitude of subsequent secondary settlements".*

106. Faced with this passage and others like it, Mr. Threadgold eventually agreed that he was *"very much in favour"* of surcharging and could only think of one reason why it should not be preferred over preloading. That reason was the economic one viz the additional cost of providing and placing and then removing the additional material constituting the actual surcharge over the load to be imposed by the structure. Mr. Threadgold's final position on the desirability of surcharging was expressed in the following passage in his evidence:

> *"Q. (from the Court) considering those advantages to my mind at the moment it seems it would usually be sensible to do a surcharge because of those benefits that you get in terms of reducing secondary compression. So why we do not do it as a matter of course?*
>
> *A. I believe my Lord it depends on the pressures one is under to minimise costs.*
>
> *Q. I see.*
>
> *A. If for example one says that I will put what was the design stress, I think I have shown elsewhere that the actual stresses were less but I am merely using this as an illustration, that if you apply up to that and then you monitor it carefully it is possible that within the limitations, that have been imposed by the specification on the performance, that it may well meet that specification without any further re-note, any further loading. As we know that the cost of extra fill on this site was seen as being significant and therefore it was an attempt to value*

engineering on this, so that we are not doing it because necessary the book says so but because the instrument shows this to be the case.

Q. So would I derive from that answer that if cost is not a consideration …
A. Yes.
Q. ... generally it would be sensible to surcharge?

A. Yes, that would be a sensible conclusion from that.

Q. Because there is really no down side to surcharging except the additional cost?

A. I see little downside to it, indeed I am very much in favour of it. …. (Day 10 page 102-103).

107. Finally Costain complains that, knowing the risks attendant upon a preloading scheme with these soil conditions, particularly the risk that the outcome was difficult to predict so that it might be necessary either to increase the time over which the load was maintained and/or to increase the load to turn it into a surcharge scheme, these risks should have been brought to the attention of Costain at the time. When these points were made to Mr. Marsh in cross-examination, after some prevarication, he agreed that Haswell should perhaps have drawn those risks to the attention of Costain so that they were provided with all relevant information when deciding whether or not to proceed with the recommended preloading scheme. (Day 7, pages 21-23).

Haswell's Case on the Pre-tender Design

108. It is Haswell's case that Mr. Marsh's description of the subsoil under RGF and IW as being *"predominantly granular"* together with his assessment that the subsoil would behave under load as granular material were correct interpretations of the Norwest Holst Report, alternatively were a reasonable interpretation consistent with the exercise of professional care and skill. Accordingly, since the ground would behave in a granular fashion, i.e. would consolidate rapidly with only small amounts of long term settlement, Haswell was correct in advising that a preloading scheme applying a load of 70 Kpa at the surface was an appropriate, alternatively a reasonable design for ground treatment preparatory to the construction of conventional foundations. Thus Haswell's case, supported by Mr. Threadgold, maintains that the design recommendations made by Haswell fall within the range of reasonable recommendations which would be made by a reasonably competent Geotechnical Engineer.

109. At the outset Haswell points out that Costain was by no means an uninformed or inexperienced client. Costain is a well-known and experienced organisation of building and engineering contractors and employs highly qualified engineering staff in its management as well as having its own Geotechnical Services Division which is highly experienced in carrying out site investigations. Thus if, as alleged, Haswell did not spell out matters in great detail or give all the information that might have been necessary if the client were inexperienced (such as advising of the risks of the preloading scheme) that was reasonable and understandable in the context of experience and knowledge of Costain in geotechnical matters.

110. So far as the PGAS sheets produced by Mr. Marsh are concerned, Haswell submits that the descriptions of the ground conditions were *"entirely reasonable"* and, on the basis that the dominant descriptor of the materials shown on the borehole logs is SAND, it was entirely reasonable for Mr. Marsh to describe the materials generally as being *"granular"*. Support for this conclusion is said to be found in the fact that very few undisturbed samples of the underlying soils were taken, particularly at depth. Such samples are valuable in order to be able to discover the permeability and compressibility of soils at depth. It is suggested that the reason that such samples were not obtained is that they were attempted but, owing to the lack of cohesion of the soil, it was not possible to recover intact undisturbed samples. This supports the conclusion that the soil was essentially non-cohesive or granular.

111. Haswell relies upon the provisions of BS 5390: 99 to show that soils can be divided into two categories viz. non-cohesive or granular or coarse on the one hand and cohesive or fine on the other hand. Coarse soils are gravels and sands which have no apparent cohesion whereas fine soils are clays and silts which have apparent cohesion. The BS makes clear that the characteristics of a soil are based on the particle size grading of the courser particles and the plasticity of the finer particles. These play a major role in determining the engineering properties of the soils and form a basis of the soils description. Where a soil *"sticks together when wet"* it often contains about 35% or more of fine material, and is described as a fine soil (*"CLAY"* or *"SILT"*) dependent on its plasticity. With less than about 35% of fine material (when it does not stick together) it is usually described as a course soil (*"SAND"* or *"GRAVEL"*) dependent on its particle size grading. *"All soils should be described in terms of their likely engineering behaviour, the descriptions being supplemented with and checked against laboratory results as required"*. (Emphasis supplied).

112. Based on this description, Haswell maintains that if a soil is not cohesive, it must be non-cohesive, i.e. coarse or granular. In the present case it is submitted that the results show that the soil as a whole was not cohesive so that it was correct to describe it as *"granular"* which has the same meaning as *"coarse"*.

113. On the basis that the ground in question was *"predominantly granular"* Haswell submits that Mr. Marsh correctly predicted the engineering characteristics of the soil in that the primary consolidation phase would be rapid and would achieve the great majority of the overall final consolidation whereas the secondary consolidation or creep would be small and within the contractual tolerances specified. It is submitted that these conclusions were, in point of fact, correct or alternatively they were conclusions that a reasonably competent Geotechnical Engineer could, exercising due care and skill, reasonably draw from the available evidence.

114. Haswell relies upon the cross-section produced by Mr. Marsh when he was giving evidence as supporting his interpretation of the ground conditions and points out that the cross-section was agreed as being accurate by Dr. Hight.

115. So far as Dr. Hight's evidence arising from his Figure 1.3.3 to the effect that the addition of up to 20% by weight of silt or clay to sand can reduce the permeability of the unadulterated sand by a factor of three or four times, Haswell points out that this figure was published by Dr. Hight and others in a paper entitled *"Characterisation of Clay Sands"* published at the 7th International Conference on the Behaviour of Offshore Structures. It is suggested that that report would not have been known about by the ordinarily competent Geotechnical Engineer. More specifically,

it is submitted that Dr. Hight accepted that he did not know where on the plotted figures on Figure 1.3.3 the Lostock sands would come and point out, correctly, that Dr. Hight presented no calculations based upon his figure to show what the effect on the rate of consolidation would have been of the existence of the silts and clays in this case.

116. So far as the debate between pre-loading and surcharging is concerned, Haswell's position is that the technical papers referred to or refer to preloading as a possibility so that unlike Dr. Hight's view which is characterised as *"extreme"*, it is not right to say that there are no circumstances in which it would be appropriate to use a preloading scheme alone. Support is placed upon the Alonso Report referred to by Mr. Threadgold as showing that preloading is perfectly respectable and frequently used. So far as the position taken by Mr. Threadgold is concerned, Haswell accepts that the economic argument in favour of loading was important in this case and points out, correctly, that, early on, Costain had made it plain to Haswell that it wanted to put in a competitive bid in order to secure the contract (which, of course, was the very reason for the choice of ground treatment rather than piling for the foundations in the first place). Thus it is suggested that the only argument that Mr. Threadgold could think of to support a decision to preload, viz the economic argument, was in fact operative in this case. But, finally and, in any event, it is pointed out that, as things turned out, the preloading scheme was eventually transformed into a surcharging scheme when the one metre of additional fill was added in September 2002.

117. So far as the complaint that Haswell had not warned Costain of the risks of using the preloading scheme is concerned, Haswell relies upon the provision in its memo dated 22 January 2002 which made it clear that the baseline point from which the contractual settlement tolerances should be measured was the commissioning of the structure. This provision, it is argued, made any warnings unnecessary since the great majority of the settlement would have taken place before the buildings became operational. As to any other warnings of risks, it is said that Costain, being an experienced client, did not need to be expressly warned about matters which they must have understood already like the possibility that more time would be needed or a greater load would need to be applied depending upon the results of the monitoring of the mound. But, in any event, Haswell submits that a warning <u>was</u> given in the form of the stipulation pre-tender that, if the contract were awarded to Costain, then a further Geotechnical Assessment would need to be undertaken so that a final detailed design for the ground treatment could be provided by Haswell.

118. But, it is pointed out, that, due to the delays experienced by Costain in gaining possession of the site and therefore the delays in carrying out the further site investigation by CGS, Costain's programme had to be foreshortened with the effect that the placement of the fill on the mound was virtually completed before the site investigation report by CGS was produced. This meant that events had overtaken the parties' previous intentions with the result that Haswell were not in a position to carry out a revised design as intended. However it is not Haswell's case that, had it been given time to prepare a revised design, it would in fact have made any significant revision to its original design. Accordingly this point as to the consequences of the delays pales into insignificance.

<u>The correct interpretation of the Norwest Holst Report.</u>

119. I have considered in detail the very considerable body of evidence on this issue, not only from two highly experienced experts but also, at length, from Mr. Marsh, the designer, himself. I have

also considered the detailed submissions most helpfully made by Counsel on this key issue both in their written opening and closing submissions. As a result I have to the conclusion that the interpretation of the Norwest Holst Report suggested by Costain and supported by Dr. Hight is to be preferred to the alternative interpretation suggested by Haswell.

120. All parties agree that the ground conditions underlying the RGF and IW were complex and variable both vertically and laterally. This can be demonstrated by Mr. Marsh's own workings vis. the two PGAS documents for the IW and RGF **(F3/241-242 and F3/245-246)** which formed part of the initial design. In the case of the IW, the top alluvium strata is described as:-

> *"Predominantly loose, locally medium dense, clay and silty SAND with some layers of medium dense gravely SAND and still CLAY."*

The description of the alluvium under the RGF is as follows:-

> *"Inter-bedded firm, locally soft, silty CLAY with very loose and loose locally silty SAND with local SILT horizons."*

Additionally the cross section formed by Mr. Marsh (Exhibit AM1) is a pictorial description of the same general picture limited to Boreholes 8 and 12.

121. Two things are striking from these descriptions. The first is how different they are with the IW alluvium being described as predominantly SAND whereas the alluvium under the RGF has CLAY as its predominant descriptor. Yet, notwithstanding these differences, under the heading *"Foundation Assessment"* on the PGAS sheets, the description given is identical in each case. In fact the whole of the PGAS sheets for these two buildings are to a great extent identical. It follows that Mr. Marsh considered that there were no significant differences between the sub-soils in question so that exactly the same considerations and resulting design apply to each.

122. In this conclusion I consider that Mr. Marsh fell into error. It is plain, even to a layman, that the descriptions of the alluvium stratum are very different from one another as written. But, bearing in mind the quite different engineering characteristics of sand, being coarse or granular material and clay being fine and cohesive material, one would have expected a competent geotechnical engineer to spot this difference and draw attention to it. Mr. Marsh failed to do so.

123. The matter goes even further since the evidence shows that the consolidation behaviour of coarse materials such as sand and fine materials such as clay vary very significantly under load. In summary, under load coarse materials consolidate rapidly and almost completely with only small amounts of long term settlement to come, whereas clays, being less permeable and more compressible, do the reverse, i.e. the primary consolidation is slower and the secondary consolidation larger and over a much longer period of time. In my view any competent geotechnical engineer would be aware of the significant differences.

124. However, the position is complicated in this case since, as so often is the case, the relevant strata were not clearly differentiated one from each other but, in places mixed together. Thus, within the sand there were layers of mixed clay and silty sand and there was also inter-bedding

of silty clays with loose silty sand. Further, the agreed Borehole Schedules show the results of the PSD tests on the boreholes which show that a percentage of silts and clays at many levels was considerably over 35% which is the rule of thumb delineation threshold in BS 5390 between coarse and fine soils. Thus, when considering how the soil will behave under load, as the designer must, he will have regard, not merely to the description of the materials found but also to their engineering characteristics to be derived from the laboratory tests carried out on those materials. This is what BS 5390 emphasises. the Engineer must do.

125. A reasonably competent geotechnical engineer would know the significant differences in permeability and compressibility between coarse and fine soils. That is very basic. He should also, in my judgment know or, at the very least, be able to work out for himself, that if coarse material like sand is adulterated with quantities of fine material such as silts and clays, the effect is bound to be that the permeability of the sand is reduced. The ordinary engineer may not know that it can be reduced by factors of 3 or 4 but he is bound to know that a significant reduction will occur. That follows, as a matter of commonsense, from a knowledge of the different characteristics under load on the different soil types. It seems to me to be tolerably clear that Mr. Marsh either completely ignored the effect of the fine soils found in the borehole logs or significantly under-estimated their effect on the behaviour of the *"predominantly granular"* soils. This can be demonstrated from the second paragraph of his recommendation on the PGAS sheets which states as follows:-

> *"It is considered that, given the granular nature of the strata, surcharging of the ground prior to construction will improve the properties of the formation to enable conventional construction to take place. This surcharging will pre-load the ground and therefore take out the significant settlements. A surcharge load of circa 70KPa (circa 304m) for a duration of 6 to 8 weeks would be satisfactory."*

In evidence Mr. Marsh explained this on the basis that he considered the subsoil would act as granular material in which case the primary consolidation would be very rapid (a matter of days) and the secondary consolidation very small (within the contractual tolerances for settlement). In reaching this assessment, in my judgment, Mr. Marsh failed to take any or any proper account of the very significant amounts of clay or silt found in the boreholes which would have a marked effect on the bearing characteristics of the sand. In short, Mr. Marsh was deceived into applying one general description, *"predominantly granular"*, to the whole subsoil whereas, in truth, the subsoil was by no means homogeneous and contained soils which rendered the general description of *"granular"* positively misleading. It may well have been that much, if not most of the material was granular in nature but the important point is that engineering characteristics were altered by the presence of significant quantities of fine materials.

126. Finally, as further evidence that Mr. Marsh mis-characterised the engineering performance of the soils, when the whole site was overlaid with 4m of fill, the actual settlements measured under the IW were significantly greater than those measured under the western part of the RGF. That difference is entirely consistent with the different engineering characteristics of the subsoils which were accurately drawn on Exhibit AM1. Owing to the presence of layers of sandy clay under the RGF, one would expect the ground to consolidate slowly and over a long period of time whereas the presence of predominantly sand under the IW would lead to the opposite settlement characteristics. The monitoring data, even with the caveats which must be applied

to it, show this was indeed the result in practice. Of course Mr. Marsh could not have known that at the time but it is, in my view, strong evidence that Mr. Marsh's interpretation that the bearing characteristics of the soils under the RGF and the IW were identical was incorrect.

The recommendation to preload.

127. So far as Haswell's recommendation to pre-load the site rather than apply a surcharge is concerned, in my judgment the evidence is perfectly clear. Unless there are compelling economic reasons to prefer pre-loading, in all ordinary cases, an engineer contemplating ground treatment should prefer to design a surcharge scheme rather than pre-loading. This is because a surcharge scheme has the benefits of over-consolidating the ground so that any secondary consolidation or creep is greatly reduced. It will also, of course, have the additional benefit of acting as a safety margin by eliminating differences in the bearing characteristics of the underlying soils to a greater extent than if a lesser load were used. Thus it is a safer option from all standpoints. The fact that Mr. Marsh never even considered the surcharge scheme is in my judgment a striking example of his inexperience in this particular field.

128. Haswell argues that the economic exception applies in this case since it is said that Costain was keen to have the ground treatment carried out at minimum cost and Haswell was trying to comply with its client's wishes in this regard. I do not accept this argument. The experts have agreed that the application of the extra 1 metre of fill in fact applied to the mound cost £3,522. On the assumption that the surcharge scheme of 6m height should have been recommended in any event, that would amount to an extra cost of about £7,000. In the context of this case and of the much greater difference in cost of piled foundations compared with ground treatment followed by conventional foundations, I am wholly un-persuaded that the economic argument, even if raised with Costain would have, if properly advised as to the benefits, deterred Costain from accepting a proposal for a surcharge scheme. In fact this was never suggested to Costain and I very much doubt that it ever crossed the mind of Mr. Marsh to do so.

129. Another example of Mr. Marsh's inexperience was his failure, despite several requests, to provide time/settlement or height/settlement curves to Costain. Mr. Marsh had promised to provide these in his original proposal but never did so. He agreed that they would be useful in order to give Costain an idea of the pace at which settlement would take place and indeed, Mr. Marsh considered it to be essential to monitor the rate of settlement in order to see if it fitted in with his original predictions. This would have been very sensible since, if the actual settlements taking place did not fit in with the predictions, it would give Haswell an opportunity to revise their design whilst the mound was still in place. When faced with this failure, Mr. Marsh initially said that he could not remember why he never provided the curves. When pressed further, he said that he was not in a position to prepare the time/settlement curves because he alleged he did not know how much material was going to be available to be used on the mound. However, this answer did not stand up to scrutiny since, by the date of his memo of 22 December 2002, Mr. Marsh knew the amount of material which would be available because he had expressly advised that the mound would be 3-4m high.

130. On this issue I am afraid that I have been unable to accept Mr. Marsh's evidence which is contrary to the facts and the inherent probabilities. Rather I find that Mr. Marsh declined to provides these curves either because he had not produced them in the first place as part of his design and did not feel confident about being able to do so or because he had produced such curves, but did not wish to reveal them to his client, in case the actual performance of the

mound in operation was significantly different from his predictions. Whichever explanation is correct, I find that a reasonably competent geotechnical engineer in such circumstances would have had to produce such time/settlement curves as part of his thinking process in deciding on his design and, even if he did not at that stage, he would need to do so in order to compare the monitoring results with his predictions. In failing in this regard, I find that Mr. Marsh fell below the standards of skill and care to be expected of a reasonably competent geotechnical engineer.

131. Finally, as to the failures by Mr. Marsh to warn Costain of the risks inherent in the scheme which he proposed, I find that this complaint is also made out. It is obvious, and must have been obvious to Mr. Marsh, that there were considerable uncertainties connected with the design being proposed, particularly since he did not propose a surcharge scheme. The uncertainties involved the length of time that it would be necessary to maintain the mound and also the fact that it might become necessary to increase the height of the mound depending on the results. Mr. Marsh did not warn Costain about either of these matters which they would need to know about in order to take an informed decision whether or not to accept the pre-load system recommended. For example, had Costain been told that they would get more primary settlement and thus less secondary settlement were a surcharge scheme to be adopted, Costain might well have opted for that option. However, they were never given this information nor did they have the chance to choose between the two options.

132. Again, I consider that Mr. Marsh fell below the required standard in failing to draw these risks to his client's attention. It is probably the case that, due to his inexperience in dealing with ground treatment works, Mr. Marsh simply did not himself know of these risks or of the benefits of recommending a surcharge scheme. But, if that is so, he should not have been designing this scheme on his own without, at least, consulting more senior and experienced colleagues who were readily available in Haswell's organisation.

Conclusion

133. For these reasons I have concluded that Haswell was in breach of its duty to exercise reasonable care and skill in the following respects:-

(i) In misinterpreting the Norwest Holst Report and concluding that the subsoil was all *"predominantly granular"* and would behave uniformly as granular material;

(ii) In failing to recognise and account for in their design the considerable variability in the subsoils, both vertically and laterally;

(iii) In advising Costain to accept a pre-loading rather than a surcharge scheme for the ground treatment works;

(iv) In failing to advise Costain of the risks inherent in a pre-loading as opposed to a surcharge scheme;

(v) In failing to provide to Costain with the height/settlement or time/settlement curves which would be necessary in order to monitor the settlement results against the settlement predictions.

134. In my judgment the pre-loading scheme recommended by Haswell should never have been recommended at all. Obviously the safest course was to recommend piled foundations which was the solution ultimately adopted once the ground treatment works had failed. It remains an open question as to whether or not using different ground treatment scheme, such as a surcharge scheme, might have been appropriate but that matter was not explored in evidence and I make no finding about it.

135. Finally, I would like to add that I find that Mr. Marsh is an experienced geotechnical engineer who fell into error in this case because he attempted to do something that he had never done before, vis. design ground treatment works without any significant assistance from more senior colleagues with greater experience of such works. In my judgment Haswell is also at fault in placing the whole responsibility for this design upon Mr. Marsh without taking the steps to supervise his work or even to check it before it was put into practice. Once the ground treatment works had failed, Haswell then deployed senior engineers to investigate the reasons for failure and reached the conclusions set out in the Haswell Report. It may very well be that, had such senior personnel been deployed to assist and supervise Mr. Marsh earlier, that this debacle would never have occurred but that must be, to a large extent, speculation.

The Post-Tender Design

136. After the site investigation report was produced by CGS following the additional site investigation carried out on Haswell's recommendation, Haswell made no significant alterations to its original design which was then put into operation. It is Costain's case that Haswell was in breach of duty in a number of further respects in failing to take account of the results of the new site investigation and in failing altogether to produce the detailed final design which Haswell itself had said would be necessary before the work proceeded.

137. In the light of my findings that Haswell was in breach of its professional duty in relation to the original pre-tender design, and that design was never changed but put into operation, it may not be necessary for a Court to make findings on this second series of allegations. However, since I have heard full evidence and submissions upon them and since they may become relevant at a later stage, I shall make my findings on these further allegations, albeit more briefly.

138. The draft CGS site investigation report was not produced until the end of July 2002, by which time the pre-load mount had been placed. However, well before then the driller's records and the provisional borehole logs were made available to Mr. David Ouston and Mr. Andrew Marsh who reviewed them and discussed their contents. Importantly, Mr. Marsh accepted that he did not consider the draft borehole logs (the more considered version) or the laboratory results dependent upon them. This was obviously unfortunate since, by common consent, the laboratory results of the soil tests are a highly important factor which a Geotechnical Engineer must take into account in deciding on the likely engineering behaviour of the ground.

139. In a fax dated 22 July 2002 sent jointly by Mr. Ouston and Mr. Marsh to Chris Jew, the following comments were made after consideration of the driller's records and provisional borehole logs:

> *"It should be appreciated that at tender stage a philosophy was presented for the foundations that could give Costain a commercial edge, however the additional site investigation was required for verification purposes and to confirm the ground conditions in order that proposed surcharging could be designed to optimise the ground*

conditions. There is always a difference in detail from a tender design to a detailed design, however we remain confident that this solution properly constructed, with a specified monitoring regime undertaken, for the structures will meet the design criteria."

"… then it is expected that due to the predominantly granular nature of the underlying ground that the "residual" settlements that will occur will be relatively small and are expected to be built out during construction prior to significant in service loading. Our calculations have shown that the residual settlement on loading is likely to be less than 15mm which is considered to be satisfactory and is not expected to be problematic on the structures concerned."

(The reference to "residual settlements" is a reference to what Dr. Height referred to as "reload settlements", i.e. the further settlements that will occur when the structure is constructed and loaded after removal of the pre-load).

Allegations of Breach of Duty

140. The following are the more important of the allegations of breach of duty made by Costain arising out of the site investigation carried out by CGS.

(i) Haswell failed to consider the laboratory results which were an important part of the site investigation. Had they properly considered and understood these, Costain alleged that Haswell would have been bound to recognise that their original design was flawed.

(ii) Costain commenced the construction of the pre-loading mound before it had received Haswell's comments on the site investigation and completed that construction before the draft report from CGS was available. Costain complains that Haswell should have warned Costain of the risk of proceeding in this way before the results of the further site investigation had been interpreted since it would be very difficult to make any significant changes, apart from increasing the height of the mound, once those results had been analysed.

(iii) Had Haswell properly considered the results of the site investigation (including the laboratory tests) it would have observed the following important differences in the findings compared with the Norwest Holst Report:-

(a) CGS made more frequent reference to the presence of sandy silts, silty fine sands and silty or sandy clays and made more frequent use of silt and clay as the dominant descriptor;

(b) The CGS Report (like the Norwest Holst Report) suggested that the silt and clay was disbursed within the alluvial material;

(c) In boreholes 4 and 5 (under or very close to the RGF) significant amounts of clay and silt were found at depths between 5 and 6.2 metres. This was further significant evidence of a lower clay layer beneath the RGF which was not present beneath the IW and hence was a significant difference between the ground conditions under those structures;

(d) Haswell should have realised that, in the relevant three boreholes, there were only two depths where water strikes occurred. By definition these were at the most permeable positions in the boreholes and so the derived values from the permeability tests taken at those locations represented the upper bounds of permeability. However these permeabilities were low for sand and reflected the strong influence of the silt and clay contents;

(e) It follows that, if Haswell had carried out any proper analysis of the CGS Report, it would have concluded that its previous conclusion that the soils were "predominantly granular" was wrong because the CGS site investigation had confirmed the presence of significant quantities of silt and clay which increased with depth. The proper conclusion would have been that below a depth of approximately 3 metres, the soils below the IW were dominated by the presence of silt and could not be regarded as granular and that none of the soils below the RGF could be regarded as granular.

(iv) As shown from email exchanges between Mr. Marsh and Mr. Ouston and the fax sent to Costain concerning the merits of using a pre-loading scheme, both Messrs. Marsh and Ouston were aware of the "presence of silty sands and soft to firm clays" which had been "proven" by the CGS site investigation and that they were properly described as "cohesive soils". In his email to Mr. Ouston of 10 July 2002, Mr. Marsh recognised that there were firm clays in the soils which would take longer to consolidate. With this knowledge Costain asserts that it was a plain breach of duty for Haswell not to re-consider their original design which had simply ignored the presence of silts and clays.

(v) As a result of the shortcomings, Costain alleges that Haswell were in breach in failing to produce either a detailed design or a modified design for the preloading scheme, despite its earlier assertions that one would be necessary. It follows that Haswell must have considered that the CGS site investigation merely confirmed its earlier conclusions as to the nature of the ground so that no re-design or modified design was necessary. Such a conclusion was plainly not one that a competent Geotechnical Engineer could have reached had he properly considered the CGS site investigation report, including the laboratory results.

Haswell's Response

141. It is Haswell's case that the CGS site investigation report merely confirmed the findings of the Norwest Holst Report so that it was unnecessary for Haswell to re-consider its original design or to produce a detailed design as had been envisaged. In the circumstances it is submitted that the failure to produce a detailed design was a matter of "form and not substance".

142. On the question of the permeability of the sands having been reduced by the presence of silt and clays, as asserted by Dr. Height, Haswell suggests that the evidence does not support this conclusion. In any event, it is pointed out that, in his calculation of consolidation times, Mr. Threadgold had used a still more conservative value for permeability so that Dr. Hight's comment in fact leads no-where.

143. Haswell further relies on the evidence of Mr. Adrian Stevens, a Chartered Geologist and Northern Geotechnical Manager for GCS with over 19 years experience in the ground investigation industry. Mr. Stevens was the person responsible for carrying out the site investigation and for collating the results and supplying the resulting report.

144. The start of the project was considerably delayed and Mr. Bell of Costain was concerned to know how long the pre-loading mound would need to remain in situ before it could be removed and the foundations constructed. He asked Haswell for this information but, in the absence of a reply, he got in touch with Mr. Stevens and asked him to help. Mr. Stevens, in response, carried out some handwritten settlement calculations and replied to Mr. Bell by fax dated 18 June 2002 as follows:-

> *"As requested yesterday we have had a brief initial look at the likely settlement totals and settlement rates for the proposed pre-loading in the area of the inlet works and the rapid gravity filters using the descriptions of the strata encountered on site and published values for parameters, as lab results are not available yet."*

Based on published settlement data for both granular and cohesive strata, Mr. Stevens calculated that total settlements under the RGF would be between 100 and 200mm, of which between 25 and 150mm would be consolidation settlement and under the IW total settlement would be between 25 and 150mm with up to 75 of this being consolidation settlement. So far as time was concerned, Mr. Stevens pointed out that this was heavily dependent on the length of the assumed drainage paths but his best "guesstimate" would be in the order of one month. He concluded his facts as follows:-

> *"Please note that these numbers are very preliminary and based on our interpretation of the ground conditions encountered at the site. They are likely to change in the light of the laboratory test results. Differing interpretation methodologies are also likely to yield different numbers."*

145. Understandably Haswell points out Mr. Stevens, being an experience geologist familiar with site investigations, did not criticise or draw attention to any shortcomings in the proposed design for the pre-loading scheme. Rather, he simply accepted that the scheme was appropriate for the site conditions in question and gave his best preliminary estimates of the amount of settlements likely to occur and the time period involved. This, so the argument runs, shows that a competent geologist supported the interpretation and conclusions reached by Haswell so that it is not possible to conclude that Haswell had been negligent.

Discussion and Decision

146. It is quite clear that the CGS site investigation report found ground conditions which were consistent with, and certainly not better than those identified in the Norwest Holst's Report. The issue between the parties is whether the CGS results showed ground conditions which were less favourable for the purpose of the pre-loading scheme advised by Haswell. In my judgment that was the effect of the CGS report.

147. The additional clays and silts found in boreholes 4 and 5 should have sounded warning bells to a competent Geotechnical Engineer that the alluvial sands in that area would be likely to be significantly affected by this cohesive material. The effect could only be to decrease the

permeability and increase the compressibility of the soil, depending on the extent of the presence of those cohesive materials. Whether or not Dr. Hight was correct in his calculations as to the decrease in permeability of the sands as a result it is not necessary for me to decide since Mr. Threadgold agreed that there would be some decrease in permeability as a result. That being so, in my judgment, it was incumbent upon Haswell to identify this and to investigate it further by carrying out the necessary calculations with all the available material in order to attempt to establish the likely permeability and compressibility of the soils affected by the presence of the cohesive material. Haswell never did this and never carried out any calculations at all at this stage. The presence of this cohesive material, particularly under the RGF, ought to have sounded alarm bells in the minds of Messrs. Marsh and Ouston since that material could not be expected to act like "granular material". In my judgment this failing on the part of Haswell constituted a breach of its professional duty to Costain.

148. I do not consider that the part played by Mr. Stevens in reviewing the ground conditions at the request of Mr. Bell throws doubt on this conclusion. I saw Mr. Stevens under extensive cross-examination and I am quite satisfied that he was carrying out a quite different activity to that carried out by Haswell. Mr. Stevens produced his advisory fax the day after he was asked to prepare it by Mr. Bell and so the time available to him was obviously very limited. Also his task was completely different from Haswell's. Mr. Stevens was simply asked to review the results he had from the ground investigation (although he also had the Norwest Holst Report) and form views on two matters viz the amount of settlement to be expected from the pre-loading scheme and the likely duration of it. He did his calculations based on published results and came up with figures which were in a very broad range and described as "guesstimates". He never was asked to, nor did he consider the advisability of the pre-loading scheme in the first place, nor did he comment upon it as to whether it was appropriate or not. That was outside his instructions.

149. Of course it can be said that, if the ground conditions were so inappropriate for a pre-loading scheme as Costain suggests, any competent engineering geologist would have spotted this even if he only took a relatively cursory look at the relevant material. But I don't consider that that is correct either. Costain does not suggest that it was as plain as a pikestaff to any competent Geotechnical Engineer that a ground treatment scheme was wholly inappropriate for the soils. Rather, on analysis, it is Costain's case that these ground conditions were deceptive in that the predominant presence of sand, plainly a granular material, might lead an inexperienced observer to conclude that the material as a whole would act as a granular material. However on closer and more expert analysis, it should have been clear to a competent Geotechnical Engineer that the presence of fine materials, such as clays and silts, both in layers and dispersed amongst the sand, would change the engineering characteristics of the ground as a whole to a significant extent. Thus, the "granular material" due to the presence of cohesive material, would not in fact act as a typical granular material in terms of permeability and compressibility. This was the fundamental error made by Haswell, coupled with the decision not to advise a surcharge scheme, properly so called, which led to the abandonment of the scheme as a whole.

DID THE SURCHARGE SCHEME WORK?

150. Somewhat surprisingly, in the light of the terms of the advice given to Costain by Haswell after the Surcharge Mound had been removed, there is an issue between the parties as to whether or not the surcharging scheme did in fact work in the sense that it consolidated the ground sufficiently for conventional foundations to be constructed in it without exceeding the tight settlement tolerances required. It is Costain's case that the evidence plainly shows that the

surcharge scheme had not worked despite the fact that an additional 1m of fill had been applied and the Surcharge Mound had remained in place for over two weeks longer than planned. Haswell's position is not that the surcharge scheme had definitely succeeded but rather that Costain has not shown, on the evidence, that it had failed.

151. Before turning to the available evidence, it is necessary to say a word or two about a topic which took up considerable time at the hearing, namely the shortcomings in the monitoring system which was designed to monitor and measure the degree of settlement in the ground under the Surcharge Mound on a daily basis until the Mound was removed. The monitoring system designed by Haswell and installed by Costain consisted of 9 steel rods to which $1m^2$ basis were welded at one end which were located right across the Surcharge Mound. The intention was that, once the Mound was fully loaded, any readings would be taken by surveyors using a theodolite to measure the amount of settlement of the steel base plate at the foot of each rod. In addition Haswell specified a network of small wooden pegs driven into the surface of the mound which, it was said, would assist in measuring the settlements, although it was never explained to the Court's satisfaction how this would work. There was nothing wrong with the monitoring system designed by Haswell except that it specified no means of protection for the steel rods during the replacement of the fill. Apparently, according to Dr. Hight, such protection is commonplace. But, due to the lack of such protection, whilst the heavy earth-moving vehicles were placing the fill, some of the rods were struck by this heavy equipment and damaged. Also, since the fill was often wet when it was laid and, owing to rain, the site conditions became very muddy, some of the rods were deformed naturally by pressures exerted by the slippery fill and the weight of the earth-moving machines.

152. The experts have agreed that, due to the damage caused in this way to the vertical rods, the settlement monitoring gave rise to spurious estimates of settlement of the plates beneath the mound so that it was necessary to exercise caution in attempting to interpret the results provided by the surveyors so as to make due allowance, wherever possible, for the damage to the vertical rods.

153. Whilst Costain was criticised by Haswell and, as I find, with some justification, for the damage caused to the vertical rods, the real issue before the Court is to determine how reliable were the measurements provided by the surveyors in the first place and secondly, whether the experts' attempts to interpret the data so as to exclude the effect of the damage to the rods was a sound and reliable basis for judgment.

The Monitoring Data

154. Having considered all the monitoring data available and, after making necessary allowances for problems with the data created by the damage caused to the vertical rods from the fill, Dr. Hight reached the following conclusions from the monitoring data as a whole:-

- Settlements at the IW were considerably larger than at the RGF which could be explained by the different ground conditions below those structures, i.e. the ground beneath the IW was more susceptible to short term settlement than that beneath the RGF.

- Settlements at the IW were much larger than were predicted by Haswell on the assumption that mainly granular alluvial material was present. It followed that

settlements on reloading by the structures would be correspondingly larger and would exceed the settlement limits. In this regard the effect of swaying rods would have been at a minimum when the first 2m of fill was placed so that the large differences in settlement under only 2m of fill shown at the IW (61.8mm – 78.7mm) when compared with much smaller settlements at the RGF (11.4mm – 31.5mm) are credible.

- The trends in the ongoing settlements for all rods when the fill height was maintained at 4m and 5m show that there were significant ongoing settlements with time under maintained fill heights. These trends in the rates of settlement are reliable as they are not affected by any striking by plant or by swaying of the vertical rods which would have occurred when the fill was placed.

- The residual settlements (i.e. the permanent settlements caused by the pre-load being the levels of the base plates after the ground had re-bounded when the mound was removed) were small, particularly at the RGF. This shows that the rebounds apparent on removing the pre-load were large. These recorded residual settlements are not affected by damage to the rods because they are based on a survey of the level of the base plates before the fill was placed and after it was removed. The very low residual settlement shown under the RGF is evidence that the pre-loading was not successful and the relatively low residual settlement under the IW shows that the pre-loading had been only partially successful.

- These differences shown between the behaviour of the ground under the RGF and the IW is consistent with the fact which was accepted by both experts, vis that ground conditions across this site were variable and that the ground under the IW was more prone to rapid settlement than the ground under the RGF.

155. Haswell, supported by Mr. Threadgold does not accept that the monitoring data is sufficiently reliable to be capable of being used to reach the conclusions advanced by Dr. Hight. In relation to Dr. Hight's reliance on the settlement recorded when only 2m of fill was placed, Mr. Threadgold points out that such trends were not mirrored by the wooden monitoring pegs knocked into the top of the mound. Further Haswell points out that Dr. Hight's views on residual settlement were based upon readings from only two out nine base plates which is an insufficient sample to be able to reach a reliable result. Haswell also points out that the base plates will have rebounded after the mound was removed, which of course is correct, so that measurements taken then can only show the residual settlement after rebound and not the maximum settlement achieved when the mound was at its full height. (Whilst this is correct, Dr. Hight naturally proceeded on that basis).

156. Mr. Threadgold produced an alternative theory to suggest why the base plates of the two vertical rods showed such small settlements when the mound was removed. Based upon a model which he created consisting of a small metal plate attached to a rod placed in a bucket of gravel, Mr. Threadgold showed that, as the vertical rod was moved from side to side, the base plate lifted thereby allowing gravel to slip beneath it. Many iterations of this process gradually raised the base plate to higher levels. He suggested this must have happened as the vertical rods were caused to sway from side to side in the mound.

Discussion and Decision

157. The main difference between the experts on this topic is that Dr. Hight attempts to make use of the monitoring data, even though he accepts that it is unreliable and great care needs to be taken when using it whereas Mr. Threadgold's approach is, effectively, to reject the data as being wholly unreliable so that it is not possible to draw meaningful conclusions from it. One thing the experts do agree upon is that the ground conditions under IW are different from those under RGF so that one would accept greater settlements under IW than under RGF. They are also agreed that the settlements recorded under IW are greater than those predicted by Haswell. Dr. Hight relies upon all the data to show that the trends from the nine vertical rods were clear i.e. that settlement was a continuing process throughout the whole period during which mound was in place and that settlement under the IW was considerably greater than under RGF. In addition the measurement of the levels of the two base plates recorded residual settlements which were low indicating that the rebound had been high. This too indicates that the settlement had not reached its and it was removed. These findings are only consistent with a conclusion that the settlement of these soils under load was not uniform nor was it rapid as predicted by Haswell. It was found to have different characteristics under the two buildings and, under both, it was still continuing after the mound had been in situ for over ten weeks. This is quite contrary to the model predicted by Haswell.

158. I find that the approach of Mr. Threadgold to the monitoring data to be dismissive and unconvincing. Mr. Threadgold provided no sufficient or convincing explanation for ignoring the trends shown by the monitoring data which, even if the data is inaccurate in some cases, are still trends established from measurements of all nine rods, including some which were not damaged. So far as the residual settlement measured from the base plates is concerned, I do not find the model prepared by Mr. Threadgold of a metal plate attached to a vertical rod placed in a bucket of gravel to be sufficiently similar to the conditions occurring under the mound to provide any assistance in resolving this problem. Mr. Threadgold failed to explain to my satisfaction how the metre square base plates under the mound could have been lifted up when the rod was moved laterally, bearing in mind the massive weight of the mound resting on the base plate. To my mind it is much more likely that when lateral forces were exerted on the vertical rods, the rods themselves would deform rather than the base plates being displaced. This view is consistent with the evidence to the effect that many of the vertical rods were bent, sometimes considerably bent, in their mid-sections and also with the evidence that no damage was found at the welded joint between the vertical rod and the base plates which might have been expected on Mr. Threadgold's theory.

159. For these reasons, I have no hesitation in concluding that Dr. Hight's accounts and conclusions are to be preferred to Mr. Threadgold's with the result that it has been established that:

(i) Settlements under the two buildings were markedly different one from another;

(ii) The settlements under IW were greater than predicted by Haswell;

(iii) The settlements were continuing throughout the whole period when the mound was in place;

Cone Penetration Tests Results

160. After Costain had taken the decision to abandon the surcharging scheme and to proceed with pile foundations instead, Haswell decided to carry out a series of Cone Penetration Tests (CPTs) in order to seek to establish whether or not the surcharging scheme had sufficiently strengthened the underlying soil. CPTs were specified by Haswell both within and outside the charged area so that a comparison would be capable of being made. It is axiomatic that Haswell considered that CPT tests would be a valuable tool to assist in determining whether or not the surcharging scheme had been successful. It was common ground that the Cone Penetration resistance ("qc") is a measure of the strength and stiffness of the soil in situ and, since the purpose of the surcharging scheme is to increase the strength and stiffness of the soil, it follows that CPTs are an appropriate measure for this purpose.

161. It is also, common ground between the experts that several of the CPTs were close to enough to the boreholes put down in the ground investigations for the boreholes to be used for calibration purposes, i.e. to calibrate qc readings with soil profiles. It is also common ground that the CPTs carried out outside the surcharged area were representative of the pre-surcharge condition of the soil which was later surcharged. Thus, in the absence of CPTs carried out before surcharging, these new CPTS could be used to assess the effectiveness of the surcharging scheme by comparing the qc profiles from outside the surcharged area with those carried out within the surcharged area.

162. Based on the CPT results, Dr. Hight reached the follow conclusions:

- So far as the area of the IW and the eastern part of the RGF is concerned, a comparison of the qc values outside the surcharged area shows that the qc values within the surcharged area in the upper 4m of depth have increased. This shows that, in this area, the surcharge had been effective to some extent. However the qc values decrease with depth so that below the depth of about 4m, it had little or no effect.

- So far as the western part of the RGF is concerned, a comparison of the qc values showed that the qc values in the upper 2m were low suggesting that the surcharge had had little effect. There was some evidence of improvement between 2m and 4m but none below 4m. Again this comparison shows that soils having low penetration resistance and therefore low strength and high compressibility persist even after pre-loading.

- In conclusion the CPTs show that the surcharging did not work appreciably under the western part of the RGF and was only partially successful under the remainder of the loaded area. These conclusions are consistent with the conclusions arrived on the monitoring data.

163. In his first report under the heading "Further Issues" Mr. Threadgold deals with the question of whether or not CPT tests are a useful means of establishing whether the surcharge treatment had been effective. He points out that CPT tests often give results of settlement which are widely different from those experienced in practice and that, since CPT tests cannot indicate whether a granular deposit is normally over-consolidated, such testing would not be able to show the effect which the surcharge would have had. He concludes at paragraph 12.10 as follows:-

"Hence I conclude that the CPT could not provide a means of reliably measuring any improvement or differences between the soils which have been surcharged and those which have been. Any differences which might be detected between such areas may be partially due to the drainage blanket placed at the base of the surcharge and natural variation in this alluvial environment."

Discussion and Decision

164. It is clear that CPT results are routinely used to predict settlements as shown by the references appended to Dr. Hight's report at paragraph 11.3.1 and by the Alonso Report. More particularly it is clear that Haswell itself, a specialist civil engineering firm, chose to use CPT tests for the very purpose of establishing the stiffness and strength of the soil in order to discover whether the surcharging had worked. In paragraph 2(v) of Haswell's Final Analysis Report it is stated:-

> *"(v) In the absence of reliable results Clear Penetration Tests were carried out to determine whether surcharging had worked. This followed removal of the surcharge."*

165. One of the reasons given by Haswell for recommending piled foundations appears in paragraph 5 of this Report as follows:-

> *"(v) CPT figures being outside the permitted and process driven tolerances."*

166. Due to his wholesale rejection of the use of CPTs to assess whether the surcharging scheme had been successful, Mr. Threadgold also took issue with Dr. Hight and, indeed, with the conclusions of the Haswell Report itself on the conclusions to be drawn on the CPT results. But Mr. Threadgold did not feel it necessary to interpret the CPT results himself in order to provide his own opinion on what conclusions could possibly be drawn from them.

167. In these circumstances I have no doubt that the approach of Dr. Hight and of Haswell itself is to be preferred. I find as a fact that CPTs are frequently used for the purpose of measuring the stiffness and strength of soils from which calculations can be made in order to predict future likely settlements. This is routine civil engineering practice. The fact that Haswell itself, when seeking to establish whether its design had worked used this methodology, speaks volumes for its utility and reliability. That being the case, I reject Mr. Threadgold's reservations as to the use of CPTs and conclude that the conclusions drawn by Dr. Hight as to the effect of those results is to be preferred.

The Haswell Report

168. Finally and, predictably, Costain relies upon the Haswell Report on Settlement Analysis dated 4 November 2002 in support of its case that the surcharge scheme had not worked. That report, which has been extensively referred to above, concluded that, on the basis of all the evidence available:-

> *"The likely differential movements between the structures and the pipe connections are therefore expected to be between 10mm and 30mm. Absolute settlements of up to 50mm could occur.*

The specification requires 25mm maximum settlement and Ondeo Degremont require a differential of 15mm as a process condition. The results in tables C and D indicate a possibility of 50mm and 30mm respectively."

169. Although the report does not expressly say so, these statements lead irresistibly to the conclusion that the surcharging scheme has not achieved what the Contract Specification required. That conclusion was not qualified in any way and led to the recommendation that the only safe course to adopt was to pile the foundations.

170. In their memorandum dated 15 October 2002, Colin Bruce and Kevin Raven, two senior geotechnical engineers with Haswell described CT tests as *"a highly accurate site investigation tool."* It is against this informed opinion expressed by senior members of the client, that Mr. Threadgold's contrary opinion needs to be compared.

171. In cross-examination Dr. Hight accepted that, in some respects, the Haswell Report was conservative in that it predicted settlements which might be greater than would actually be achieved. He accepted that Haswell's value for Young's modulus was conservative as was the value used for the loading of the structure. Again, the assumption that the foundations would behave flexibly was also on the conservative side. As against this Dr. Hight pointed out that the Haswell Report did not appear to take into account the future settlement or creep which would occur once the building was complete over a lengthy period of time. The overall value of such creep could be as high as 50% of the settlement occurring upon and shortly after full loading of the ground. Dr. Hight considered that this was an omission in the report and counterbalanced the other respects in which he agreed that Haswell's approach had been conservative.

172. Finally, at the end of the cross-examination of Dr. Hight, a calculation prepared by Mr. Threadgold was put to him for comment. The calculation, which had apparently been prepared by Mr. Threadgold during the course of the trial, purported to show that, based on certain soil samples a prediction of settlement far below that predicted by Haswell could be achieved. It transpired in evidence that the calculation was based upon a borehole sample taken from outside the surcharge site as well as a sample of sand taken from a different site altogether. The calculation was based on the assumption that the layer of soil in question contained half sand with the same characteristics as sand taken from the other site and half clay with the same characteristics as the sample taken at one level of the borehole. When Dr. Hight gave a description of the nature and provenance of these samples he concluded that the basis of the calculation was flawed and was not relevant since it was not representative of the soil underlying the surcharge area.

173. I found it a little surprising that, faced with the plethora of data and other material available from the site in question, Mr. Threadgold should produce, at the eleventh hour, a simple calculation based upon such a questionable sample. I find that the calculation based on the sample is of no assistance to me due to the unrepresentative nature of the samples taken and the fact that, being produced so late, there was no proper opportunity for Dr. Hight and Costain to consider them in any detail.

Overall Conclusions

174. I have therefore concluded that, both on the basis of the monitoring data gathered during the surcharging process and of the CPT results recovered after the mound was removed together

with Haswell's analysis of those results lead irresistibly to the conclusion that the surcharging scheme designed by Haswell had failed to produce its intended result. The facts that the settlement characteristics under the IW and the RGF buildings were quite different and that settlement under both buildings was continuing over ten weeks after the mound was first placed both indicate that the basis upon which Haswell advised the ground treatment scheme was flawed. Haswell's own analysis of the CPT results showed clearly that future settlements, albeit conservatively assessed but ignoring creep, would be likely to exceed the specified contractual tolerances. On that basis Haswell advised that Costain should change the design so as to provide piled foundations. On this basis I conclude that Costain has shown quite clearly and to my satisfaction that the surcharging scheme designed by Haswell had indeed failed.

PROLONGATION

175. In paragraphs 82.12 – 82.30 of the Amended Particulars of Claim, Costain alleges that the time taken to complete the additional work and tests on the pre-loading scheme, the design of the piled foundations and the completion of the piling works resulted in the Treatment Works sustaining a critical delay of 12 working weeks and 4 working days. As a result Costain *"had to remain on site for an additional 12 working weeks and 4 days and, as a result, incurred additional general site overheads totalling £577,018 …."* (paragraph 82.19). When this claim was quantified by Costain, it was done so on the basis of claiming the general site overheads referable to the actual period of alleged delay vis. October 2002 – January 2003. Thus it is clear from this pleading that Costain was alleging that the delays brought about by the abandonment of the pre-loading scheme and the later design and construction of piled foundations to the RGF and IW caused critical delay to the project as a whole of over 12 weeks. The damages claimed as a result of that alleged delay were calculated on the basis of the weekly cost of the whole site overheads referable to the actual period of delay and not to the alleged prolongation of the Treatment Works at the end of the project.

176. Both parties engaged experienced programming experts to assist them and the Court in calculating the relevant periods of delay caused by the events in question. Costain engaged Mr. John S. Crane, BSC, a Director or Gardiner & Theobald Fairway who has over 35 years experience in the construction industry and who is a well known planning and programming expert. Haswell engaged Mr. Alan Purbrick BSC, Chartered Quantity Surveyor and Managing Director of Capital Consulting International, which is a specialist consultancy practice covering all aspects of programme analysis and project monitoring. Pursuant to Orders of the Court, the experts met on a number of occasions and agreed on many matters which has been of great assistance to the parties and to the Court. For example, they agreed that the appropriate methodology to assess delay in this case was the one known as the *"time impact analysis"* or the *"windows slice analysis"* which involves considering the state of progress of the project prior to the delaying event in question and then impacting the effect of that delaying event on the Contract Programme in order to establish the time effect of that event, in particular the delay to the Project Completion Date. The experts also agreed which Contract Programme to use as the Baseline Programme for their delay analysis and also agreed the as-built data showing when individual activities started and ended. Crucially the experts have also agreed that, the delays to the construction of the foundations to the RGF and IW caused critical delays since the RGF was on the critical path of the project at the time. (In this regard it should be noted that the term *"critical delay"* as opposed to any other type of delay, connotes that the delay in question was to an activity which was on the critical path of the project so that a delay to that activity would,

all other things being and remaining equal, inevitably lead to a similar delay to the project completion date).

177. At one time, Mr. Purbrick was not convinced that the option offered by the programming software in question known as *"Progress Override Scheduling Option"* was the appropriate one to use. But, after further consideration, in his evidence Mr. Purbrick withdrew his objection to the use of that option and Haswell no longer pursues it as a potential issue.

178. Since there has been such a large measure of agreement between the programming experts, in this Judgment, I shall simply deal with and resolve the remaining issues upon which they were not agreed. These are 7 In number.

Issue 1: The way the agreed methodology has been applied

179. Haswell submits that Mr. Crane has not correctly applied the time impact analysis method in that, rather than applying the impact of the delaying event himself and assessing its consequences, he has used Costain's monthly updated progress programmes for that purpose and, after the correction of certain anomalies, has accepted those programmes as correctly showing the impact of the delaying event. Mr. Purbrick, on the other hand, has carried out what he considers to be the more correct approach, namely to consider the state of the progress of the works prior to the inception of the delaying event and then impacting that event on to that programme in order to see what the software produces as the impact of that event. It is not clear to me what difference to the actual results these alternative approaches lead to but, if it becomes material to decide, I prefer the approach of Mr. Purbrick.

180. The reason for that preference is that it eliminates any subjective distortion or manipulation (either advertent or inadvertent) in the production of the monthly progress programmes by Costain. Mr. Purbrick's approach seems to me to be more rigorous and to be more in accordance with the accepted understanding of a time impact analysis approach, as agreed by the experts.

Issue 2: Critical delay to the foundations of the RGF and IW or to the Project as a whole?

181. Both experts have concentrated their attention on the four months from October 2002 to January 2003 during which the effects of the abandonment of the ground treatment works and the design and construction of piled foundations were taking place. Both experts have agreed that, during this period, those works i.e. foundations to the RGF and IW were delayed, albeit to differing extents. They have also agreed that, at that time, those works were on the critical path of the project so that, all other things being equal, and if no later mitigation measures were taken, those delays would ultimately delay the completion of the project as a whole. But the experts have not considered the effects of the delays to the foundation works on all the other activities taking place on site during the relevant period nor have they carried out any investigation, post-January 2003, to see whether the delays to the foundations of the RGF and IW, locked in to the programme as at the end of January 2003, were later mitigated, neutralised or even exacerbated by later events. The limited nature of the experts' investigations as described, becomes highly material later when the Court has to assess the damages recoverable by Costain flowing from these delays.

182. Haswell objects that Costain has claimed its alleged losses flowing from the delays to the foundation works on the wrong basis and, since it has neither claimed nor submitted evidence

from which damages could be calculated on the correct basis, this whole claim must fail in principle. The reason is this. Costain has assessed the prolongation costs of the delay claim on the basis of the weekly general site overheads of the whole project over the period October 2002-January 2003. The claim is put this way on the basis that, since the foundation works were on the critical path of the project, any delays to them would inevitably cause delayed completion of the whole project therefore it is right to claim the weekly prolongation costs of the whole project being delayed for a like period. But Costain has not attempted to show that any other activities on site, which were not dependent on completion of the foundations to RGF and IW, were themselves in fact delayed as a result of the delays to the foundation works. In such circumstances Haswell submits that the correct way in which Costain should have claimed its damages in this case was to claim the costs of the delay to the foundation works themselves together with the costs of any other site activities which themselves were delayed by reason of the foundation works. Since Costain has not made a claim on this basis, Haswell submits that the prolongation claim should fail at the first hurdle.

183. In order to understand and resolve this submission it is necessary to draw a distinction between a claim for damages for delay and a claim for an extension of time of the completion date on account of delay. When an extension of time of the project completion date is claimed, the contractor needs to establish that a delay to an activity on the critical path has occurred of a certain number of days or weeks and that that delay has in fact pushed out the completion date at the end of the project by a given number of days or weeks, after taking account of any mitigation or acceleration measures. If the contractor establishes those facts, he is entitled to an extension of time for completion of the whole project including, of course all those activities which were not in fact delayed by the delaying events at all, i.e. they were not on the critical path.

184. But a claim for damages on account of delays to construction work is rather different. There, in order to recover substantial damages, the contractor needs to show what losses he has incurred as a result of the prolongation of the activity in question. Those losses will include the increased and additional costs of carrying out the delayed activity itself as well as the additional costs caused to other site activities as a result of the delaying event. But the contractor will not recover the general site overheads of carrying out all the activities on site as a matter of course unless he can establish that the delaying event to one activity in fact impacted on all the other site activities. Simply because the delaying event itself is on the critical path does not mean that in point of fact it impacted on any other site activity save for those immediately following and dependent upon the activities in question.

185. It seems to me that Costain's claim in respect of its prolongation costs has fallen between the two stools described above. The claim is put on the basis that the delays to the foundation works caused critical delay to the whole project of over twelve weeks and the whole project's general site costs are claimed on that basis. Those costs are evaluated as at October 2002-January 2003 and not at the end of the project which occurred well over two years later in May 2005. But no evidence has been called to establish that the delaying events in question in fact caused delay to any activities on site apart from the RGF and IW buildings. That being so, it follows, in my judgment, that the prolongation claim advanced by Costain based on recovery of the whole of the site costs of the Lostock site, fails for want of proof.

Issue 3: Delay to the Treated Water Reservoir

186. It appears that, when the decision to abandon the pre-loading scheme and substitute piled foundations was made on 25 October 2002, the works were already in critical delay on account of previous delays to the Treatment Water Reservoir (TWR). However it is agreed that Costain re-sequenced the works to the east compartment of the TWR in order to mitigate such delays and, it is also agreed, that the decision to re-sequence had been taken and the mitigation measures had been put in place prior to 25 October 2002. In these circumstances the first issue between the parties is whether account should be taken, as Mr. Crane does, of the mitigation measures which apparently eliminated the existing delays to the TWR.

187. Mr. Purbrick points out that it is quite unclear from the evidence when the actual mitigation measures which took the TWR off the critical path were actually carried out by Costain. In any event he points out that the great majority, if not all, of them must have been carried out after 25 October 2002, when the decision to pile was taken. Therefore, so he argues, when the decision to pile was taken, using a proper time impact analysis, the critical path still ran through the TWR and would continue to do so until the mitigation measures had been either completed or, at least substantially completed. He suggests that Mr. Crane's approach adopts a "wait and see" method which is contrary to the basic principle of the time impact analysis.

188. Haswell submits that the evidence as to when the decision had been taken to take accelerative measures to mitigate the delays to the TWR and also when those measures were actually put into effect is "flimsy". I respectfully agree with that view. It should have been perfectly possible for Costain to adduce cogent direct evidence on this point but it failed to do so. Accordingly I have not been persuaded that Costain has demonstrated that the delays to the TWR, which were admittedly on the critical path prior to 25 October 2002, ceased to be critical at that date. It follows that I accept Mr. Purbrick's analysis which concludes that the delays caused by the late decision to pile the foundations did not cause those works to become on the critical path until after 25 October 2002 when the decision to pile was made. It follows that any critical delays which occurred on site prior to that date cannot have been caused by any matters for which Haswell is responsible.

Issue 4: When did the piling works end?

189. The experts agree that the delays to the RGF and IW caused by the piling works would come to an end when the reinforced concrete works to the RGF building could begin. It is common ground that the main piling works themselves to both the IW and the RGF were completed on 4 December 2002 and it is Mr. Purbrick's case that that is the date that should mark the end of the delays caused by the piling works. On the other hand, it is Costain's case that further works to the piles including pile capping and blinding took place after that period and after the Christmas break right up until 14 January 2003. So the period from 4 December 2002 to 14 January 2003 is the period of delay claimed by Costain with which Haswell disagrees.

190. Mr. Andrew Langley, Costain's site agent, in his second witness statement gave evidence as to the nature of the works carried out by Costain between 4 December 2002 and 14 January 2003. He describes how the activities of excavation to the formation level for the foundations and cropping of the completed piles took place during this period. The work was difficult since it took place in a congested area and care had to be taken not to damage the newly installed piles. In this regard, Costain also places reliance upon the Daily Activity Sheets for the period in question. Starting on 10 December 2002 and running through to 14 January 2003, these sheets,

which are compiled daily, clearly indicate that, work to trim, crop and breakdown the piles to the RGF continued over the whole period. These activity sheets also indicate that pre-fabrication of the reinforcement cages for the foundations of the RGF began on 6 January 2003, when work resumed after the Christmas break. The entries on 8 and 9 January also indicate that work on the reinforcement was taking place alongside work to breakdown and trim the piles.

191. Based on these contemporaneous documents, it seems clear that, after 4 December 2002 until the Christmas break, although the piles had themselves been completed, further works to the piles in cropping and trimming them was taking place. This work was all part and parcel of the piling works themselves and so I find that the piling works were ongoing until the beginning of the Christmas break 2002. When work resumed on 6 January 2003, it is also clear that the work of trimming and cropping the piles was taking place contemporaneously with and alongside the beginning of the placement of the reinforcement for the reinforced concrete foundations of the RGF. That being so, it is correct to take 6 January 2003 as the date when the reinforced concrete works to the foundations of the RGF commenced. Accordingly I find that that is the date when the delays caused by the piling works finished.

Issue 5: Additional Piles

192. Mr. Purbrick raises another issue affecting the length of time the piling works took. He asserts that contemporaneous documents show that the initial design for the piles of the RGF showed that 275 piles were to be installed whereas in fact, this design was changed so that 339 piles were ultimately installed, being an addition of 64 piles. Mr. Purbrick calculates that the installation of the additional piles would have taken an additional five days so he reduces the period of delay which is the responsibility of Haswell by those five days.

193. In response Costain submits that Mr. Purbrick has simply misunderstood the position and that there was no variation to the original design as he suggests. An estimate of the number of piles required if the IW and RGF were to be piled had been prepared by Mr. Bell and Christine Wright in June 2002. They estimated that 275 piles would be required. Later, on 25 October 2002, Mr. Bell instructed Stent to commence the design of the piling and he repeated the estimate of 275 piles but indicated that the design for the piling would follow. Thereafter Haswell produced its detailed design and, on the basis of this design, Stent produced its quotation for 336 piles. In the upshot Stent in fact installed 339 piles. When this account was put to Mr. Purbrick in cross-examination, he confirmed that, on that basis, it could not be said that any delay had been caused to the piling works by any amendment to the design. Accordingly I find that this point simply falls away.

Issue 6: Activity X335

194. Mr Purbrick takes another point relating to the apparent lack of activity on site between 4 December 2002 when the piling works to RGF finished and 6 January 2003 when the reinforced concrete works commenced. He identifies that, during this period, there was a delay generated by Activity X335, which was the 14 day approval period for the RGF foundations. No progress on this activity occurred before 6 January 2003 and Mr. Purbrick therefore concludes that the resulting 11 days of critical delay should be reduced from the overall period.

195. Mr. Crane replies by saying that this apparent critical delay can safely be ignored since the absence of design approval did not in fact cause any delay to the progress of the RGF.

196. Whether or not Mr. Crane's view is correct, I have already concluded that ancillary works associated with the piling works themselves (pile capping and trimming etc.,) was continuing over the period 4 December 2002 – 6 January 2003 and beyond. Those ancillary works were in reality part of the piling works which themselves were, as the experts agree, causative of critical delay up until 4 December 2002. I have found that this critical delay continued until 6 January 2003. On that basis it is neither here nor there whether there was another concurrent cause of delay relating to Activity X335. Accordingly I do not consider that this point makes any difference to the calculation of critical delay for which Haswell was responsible.

Issue 7: Winter Working

197. Part of Mr. Crane's analysis maintains that an additional delay period of 14 working days should be added to the overall period of delay for which Haswell was responsible on account of winter working. The basis for this argument is as follows. Mr. Crane asserts that the critical delays to the RGF identified by him in the period October 2002 – January 2003 pushed all the works into delay. This meant that the pipe work installation between and within the buildings, instead of being carried out and completed during the summer of 2003, as programmed by Costain, was pushed into October and November 2003, a period of winter working which caused further delays resulting from low productivity inherent in working outside during the short days and bad weather of winter. For this purpose Mr. Crane takes winter as commencing on 1 October 2003 and he opines that working after that date would take 1.33 times longer than working in the summer. It is this factor of 1.33 from which he derives the additional delay of 14 working days.

198. In cross-examination, Mr. Crane frankly accepted that this claim and his calculation of it was purely theoretical since he had done no research into the actual effect of winter working on the productivity of works such as pipe work installation. He also accepted that 1 October 2003 was an arbitrary date to commence the calculation since, as we all know, the weather in October can be drier and more settled than in any of the summer months. Mr. Crane also accepted in evidence that the factor of 1.33 might be overstated since he had no solid basis upon which to make it.

199. I have no hesitation in rejecting this part of Mr. Crane's analysis. It is wholly theoretical and based on nothing but the meteorological records for the relevant period and Mr. Crane's experience and hunch. It seems to me to be unlikely that, as a matter of course, productivity of outside building works in October and November is always measurably lower than for, say, the months of August and September. In this country the productivity of outside work depends to a great extent upon the weather which can be changeable at any time of year and there can be no presumption that it will be generally worse in October and November than in any other month. In the absence of hard facts and figures to support such a claim related to the facts of this case, which do not exist, in my judgment, this claim has not been established on the balance of probabilities.

Summary

200. For the reasons set out above, I have reached the following conclusions on the disputed issues as to the correct basis for calculation of the critical delay to the project caused by the late decision to pile the foundations on the RGF and IW:-

(i) I prefer the application of the agreed methodology made by Mr. Purbrick over that of Mr. Crane. It seems to me to be more in accordance with a Time Impact Analysis approach.

(ii) I find that it has not been shown by Costain that the critical delay caused to the project by the late provision of piled foundations to the RGF and IW buildings necessarily pushed out the contract completion date by that period or at all. Nor has Costain established that all activities on the Lostock site were delayed between October 2002-January 2003 by the delaying events. No investigation has been carried out by the experts to establish that one way or the other so, as matters presently stand, it is simply a matter of speculation.

(iii) I am not satisfied that mitigation measures to reduce the existing critical delay to the TWR were put in place or became effective prior to the decision to pile the foundations on 25 October 2002. That being so, it seems that, prior to that date, no critical delay was caused to the project by any matters for which Haswell is responsible.

(iv) I find that the effect of the delays caused by the late piling works ended on 6th January 2003 when the construction of the reinforced concrete foundations began.

(v) So far as the additional 64 piles are concerned, I have found that this item was not a variation to the works and so no period of time representing that work falls to be deducted from the delay for which Haswell is responsible.

(vi) I find that Activity X335 did not in fact cause any critical delay to the works since, over that period, critical delay was already being caused by the piled foundations. If any such delay were caused by the late approval for the RGF foundations, it was concurrent with delays caused by the need to pile the foundations themselves and so does not affect Costain's entitlement in any way.

(vii) I find that the case advanced on behalf of Costain in relation to winter working fails on the basis that it is purely theoretical and not supported by any firm evidence or opinion from the experts.

Conclusions on delay

201. I have submitted my findings on delay set out above to the parties for their further assistance, as a result of which they have agreed that my findings result in a delay of 40 working days (8 weeks) to the progress of the RGF and IW buildings. Accordingly I so find.

QUANTUM

202. There are a number of different heads of loss claimed by Costain as a result of the negligent advice given by Haswell in recommending the pre-loading ground treatment which ultimately failed. Costain has gathered together these claims under a number of different heads which will now be dealt with in turn.

1. Additional Construction Costs

203. Costain makes six separate claims under this Head of Claim as follows:-

(i)	Additional cost of excavating Contact Tank out of sequence -	£30,778.80.
(ii)	Placement and removal of 1m of additional fill -	£ 5,610.70
(iii)	Placement and removal of 7,456m^3 of fill over and above the quantities advised by Haswell -	£ 7,071.80
(iv)	Installation of drainage blanket (taking account of the fact that the blanket formed part of the 4m mound) -	£31,066.20
(v)	Removal of drainage blanket if the blanket was re-used -	£ 549.15
(vi)	Additional earthworks testing -	£ 3,488.16
TOTAL:		£78,564.81

Fortunately all these figures have been agreed by the parties' quantum experts as figures, subject to liability. Those experts, by whom I have been greatly assisted, were Mr. S. Robins (Systech Dispute Services) for Costain and Mr. C. Huntley (Huntley Cartwright) for Haswell.

204. Before considering these claims in detail, it is necessary to decide the correct basis upon which the claims can be advanced since this is not agreed by the parties. The factual background is that, at pre-tender stage, I find that Mr. Chris Jew of Haswell advised Mr. Bell of Costain that the amount of material required to construct the 4m pre-loading mound was about 11,000m^3. Costain planned on this basis. However, there is no identifiable sum within Costain's tender representing this cost and Mr. Bell, when asked about it, was quite unable to say whether or not any sum had been included in the tender for the cost of the pre-loading mound. This may not be so surprising since the costs of the mound were not great, compared with piled foundations, and Costain was keen to keep its tender lean in order to secure the job. Accordingly I find that Costain did not include any sum in its tender in respect of the costs of the placement and removal of the pre-loading mound. It follows that Costain has not received any reimbursement from UU in respect of this item.

205. I have already found that Haswell should never have advised Costain that it was appropriate to carry out a scheme of ground treatment under the RGF and IW consisting of a 4m high pre-loading mound. In my judgment, at pre-tender stage, Haswell should have given the advice to Costain which they ultimately did after their scheme failed, vis. that Costain should use piled foundations. It follows that, had that advice been given, Costain would have included the cost of piled foundations within its tender and would have been reimbursed for them by UU. I reject the argument raised on behalf of Haswell that, since Costain did not include any sums in its tender in respect of the pre-loading mound, it is likely that Costain would not have done so in respect of the cost of piled foundations. But it needs to be emphasised that Costain did include within its tender the cost of conventional foundations to be built under RGF and IW after the ground treatment had been completed. Equally and, particularly since piled foundations were more expensive than conventional foundations, I find that it is overwhelmingly likely that

Costain would have included such costs in its tender had Haswell given the correct advice. On that basis those costs would have been reimbursed to Costain by UU.

206. On that basis I consider that (subject to any recovery from UU under the Contract) Costain would be entitled to recover as damages all of its costs incurred in placing the initial 4m of fill, then raising it a further 1m in height and finally in removing it since none of these costs would have been incurred if Haswell had not advised incorrectly that ground treatment works were appropriate. It is on this basis that I approach the six heads of claim for additional costs raised by Costain.

(i) Additional Cost of Excavating Contact Tank out of Sequence

207. This claim rests effectively on one short paragraph in Mr. Bell's second witness statement where he deposes as follows:-

> *"At paragraph 65 of my first witness statement, I omitted to mention where the extra 1m of fill for the surcharge mound came from. The material was excavated from the area where the contact tank was to be located. This meant that the contact tank was partially excavated out of sequence. This out of sequence working meant that we incurred additional costs. These costs were due to having to remove the better material from the surface leaving the weaker and water-logged material to be removed during the contact tank excavation. Thus the excavators had to " hay make" the material to the outside of the tank before loading."*

The only documents supporting this claim was an Interim Valuation from Ruttle Contracting Limited, the Earthworks Contractors, which shows that, in the Contact Tank area, an extra-over cost of £2.60 per metre^3 was claimed in respect of 11,838m^3. But no further explanation is given as to what was the reason for or nature of this extra-over charge. Haswell points out that the same extra-over charge was made by Ruttle Contracting Limited in respect of other excavations on site so there is no proven causal link between the need for the 1m of extra material at short notice and this extra-over charge.

208. It is to be noted that the additional 1m of fill required some 5,906m^3 of material which was taken from the area where the Contact Tank would later be excavated. However, the extra-over charge claimed by Ruttle Contracting Limited, which Costain now seeks to recover from Haswell, related to some 11,838m^3, about double the amount used. Overall, there is a great lack of evidence on this item and I am not satisfied that Costain has established this loss at all. The decision as to where to find the additional 1m of fill was taken by Costain and it seems that, as a consequence of that decision, Costain may have had to pay an extra-over charge to its Earthworks Contractor. However, it is not at all clear to me what was the basis of that charge or that it was necessitated by the need to find some 5,906m^3 of fill at short notice. But, even if it was, that was Costain's decision and it does not seem to me that, in addition for having to pay for the cost of the fill and its placement in any event, Haswell can be shown to have been responsible for this significant extra-over cost paid to Costain's Earthworks Contractor. Accordingly, in my opinion, Costain has simply failed to establish this head of claim.

(ii) Placement and Removal of 1m of Additional Fill

209. This work was carried out on Haswell's specific instructions in order to accelerate the measurable settlement of the surcharge mound by increasing the load. It plainly flows from Haswell's persistence with its defective design so that the cost of this work is recoverable by Costain by way of damages. However no sum is payable by Haswell for this item as I find, later in this Judgment, that Costain has already been paid by UU for it.

(iii) Placement and Removal of 7,456m^3 over and above the quantities advised by Haswell

210. This claim is based upon the fact that, at pre-tender stage, Haswell advised Costain that it would need about 11,000m^3 of fill to construct a 4m pre-loading mound. Costain had the opportunity to but did not include any amount in respect of this item in its tender which was later accepted. However, when the mound came to be constructed, it was found that additional fill of 7,456m^3 was required over and above the estimate of 11,000m^3. This claim represents the cost of placing and removing that additional fill. Costain makes no claim to recover the cost of placing the 11,000m^3 of fill as advised by Haswell.

211. I have already found as a fact that Costain did not include anything in its tender for the cost of the pre-loading mound. I also conclude, that had Haswell given a more accurate estimate of the amount of fill required, it is unlikely that Costain would have included the additional cost of about £7,000 in its tender. Such sums are small beer when considered against the total amount of Costain's tender viz. about £23 million. Accordingly any loss suffered by Costain in this regard has been brought about by Costain's own actions.

212. In any event, I am not satisfied that Costain has established that Haswell was in breach of its professional duty of skill and care in advising that the correct figure was 11,000m^3. The experts have not addressed this question and I would be unable to find liability against Haswell on this item in the present state of the evidence. Accordingly this claim fails in its entirety.

(iv) Installation of Drainage Blanket

213. This claim is made on the basis that, on Haswell's advice, Costain provided a drainage blanket of granular materials immediately beneath, and as part of, the pre-loading mound. After the mound was removed, much of that granular material was used in constructing piling mats for the platforms upon which the pile drivers and other necessary equipment for the piling works were located. As in the case of the pre-loading mound, apparently Costain's tender did not contain any allowance for such piling mats. But that tender did not include and could not have included any cost for the drainage blanket as Haswell first recommended that it be used after UU had accepted Haswell's tender.

214. Had Haswell given the correct advice at the outset, there would have been no need for Costain to supply, lay and later remove the drainage blanket at the agreed combined cost of £31,615.35 (items (iv) and (v) together). Thus that sum is recoverable by Costain as having been caused by Haswell's negligent advice.

215. However against that sum Costain should allow a credit for the fact that it re-used much of the granular material used in the blanket for the provision of piling mats which had never been included in its tender. No figures have been agreed for the amount of this credit but it does not seem to me that it should be large bearing in mind that the piling mats are temporary works for

which Costain chose to make no allowance in its tender. On this basis I assess this credit at £2,000. Thus Costain's recovery on items (iv) and (v) amounts to £29,615.35.

(v) Removal of drainage blanket

216. I find that this item is subsumed within the previous head of claim which Costain is entitled to recover.

(vi) Additional Earthworks Testing

217. This claim in the agreed sum of £3,488.16 represents the cost of the additional trial pits and CPT testing carried out at the request of Haswell between September and October 2002.

218. On the face of it this is a legitimate claim since it would not have been necessary had Haswell not advised the ground treatment works. However, Haswell argues that this cost only needed to be incurred in order to test whether or not the ground treatment works had been successful. Had Costain correctly managed and monitored the placement of the fill so that the vertical measuring rods were not damaged as occurred, it would have been possible to determine from the measurements taken whether or not the scheme had worked. Thus, it is argued, that this cost was caused, not by Haswell's negligent advice in the first place, but rather by Costain's failure to protect and monitor the levelling devices installed in the mound.

219. I am unable to agree with this analysis. It seems to me that, at the time, everyone agreed that this further testing was sensible and it is by no means clear to me that, even if the installation of the monitoring devices had been perfect so that useful and accurate measurements were available, that Haswell, without further testing, would have accepted that the scheme had failed which I have found it had. Accordingly I consider that it is more likely than not that this further testing would have been required for its intended purpose whether or not the monitoring of the performance of the mound was as unsuccessful as it was in practice. Accordingly I consider that this claim succeeds.

2. Cost of Piling

220. Under this Head Costain claims the total sum of £179,871.40 representing the costs to it of carrying out the piling together with certain additional works for the RGF and IW. This cost was never recovered from UU since the Main Contract contemplated that Costain would construct ordinary conventional foundations to these buildings after the ground treatment works. Costain claims this sum on the simple basis that that is what is cost Costain to get out of the situation it was in, caused by Haswell's breach of duty, and it is recoverable on that basis.

221. The basis upon which Costain seeks to recover this sum is the same basis as an Employer would seek to recover damages from a Contractor on account of defective work vis. the cost of reinstatement or repair. However, the position is quite different here. As a matter of principle, Costain is entitled to be put into the same position it would have been in, so far as money is capable of doing that, had Haswell advised competently at the pre-tender stage. Haswell should have advised that a piled solution was appropriate for this site in which case Costain would have included the cost for piled foundations in its tender. It would then have recovered that sum, and only that sum, once the piling work was carried out, regardless of what it actually cost Costain to do it. Accordingly, the task of the Court is to discover what sum Costain is likely to have included in its tender on that basis.

222. Haswell's initial position is that Costain has not called evidence to seek to show what sums it included within its tender in respect of the piled foundations of other buildings on the site and, accordingly, this claim should fail since Costain has not laid a sufficient evidential foundation for it. I cannot accept this argument. Haswell cannot suggest that Costain included no allowance in its tender in respect of other piled foundations and, in my view, it would be extraordinary if this were the case. Accordingly, I find that, had Costain been properly advised by Haswell, it would have included a sum in its tender for piled foundations for buildings RGF and IW. But the question still remains how much that sum would have been.

223. In this regard Haswell points to a document from Costain to UU in June 2002 in which Costain was making a proposal to UU to pay for the costs of piled foundations to RGF and IW in any event in order to accelerate the works. At that time Costain assessed the costs of piled foundations to those buildings in the total sum of £130,375 in respect of construction costs plus £10,000 in respect of design costs. Haswell suggests that that figure is the maximum figure that Costain would have been likely to include in its tender for the piled foundations if it did so at tender stage. But Haswell suggests that Costain would not have included the additional costs of £10,000 for design.

224. In my judgment, Haswell is correct in its approach to this head of claim. In the context when Costain was keen to reduce its tender price significantly in order to secure this job, it seems highly unlikely to me that Costain would have included a figure in its tender of more than the costs it was putting forward some 6 months later, in June 2002. Accordingly I find that the true measure of Costain's loss under this head is the sum which it would have recovered from UU had it priced its tender on the basis of piled foundations. That sum is £130,375 since I exclude the design costs as I think it is highly likely that Costain would have absorbed them itself, just as it absorbed the costs of the ground treatment works advised by Haswell.

225. Haswell has also argued that Costain would have been likely to reduce its quotation at the time of tender to bring it into line with other tender items for similar work and in order to secure the contract. A figure of £94,176 is suggested as a more likely tender inclusion. Haswell also suggests that this figure should be further discounted in order to reflect the possibility that, at an increased price, Costain might not have won the contract at all.

226. I reject these arguments as being speculative and unreal. I prefer to rely on the facts of the solid basis of Costain's quotation of £130,375 which was initially relied on by Haswell in its closing submissions.

227. Costain also submits that, in addition to the pure piling costs, it should be entitled to recover the cost of the granular materials used to make the piling mats to support the piling machinery. Much of this material was reclaimed from the drainage blanket considered above. Costain submits that this cost amounts to £23,500. The cost of this item was not included in the June 2002 quotation as, by that time, Costain intended to use the reclaimed material from the granular drainage blanket for this purpose.

228. I accept this argument and consider that Costain should be entitled to recover this item which has already been allowed under head of claim 2(iv) and (v) above.

3. Prolongation Costs

229. This claim is made under four heads, divided into two prolongation periods. The first prolongation period relates to the period between October 2002 and January 2003 when the piled foundations to the RGF and IW buildings were being designed and constructed. In this period there are two claims, the first for the recovery of the general site overheads of Costain in running the site at Lostock over whatever is found to the be the correct period of critical delay during this period. Costain claims these overheads at the agreed weekly rate of £35,000. The second item during this period represents the costs of inflation in having to provide labour and materials at a later date than envisaged at the time of Tender. This cost is also agreed at the weekly rate of £6,000.

230. The second period of prolongation concerns the winter of 2003/2004 and consists again of two heads. Taking those heads together Mr. Robins assesses the weekly costs of having to work during the winter period at a total figure of £58,795 per week. This figure takes account of the additional period for winter working and any loss of productivity resulting. For his part Mr. Huntley assesses these weekly costs at £35,000 per week.

231. As Haswell correctly points out, both quantity surveying experts have agreed in the second joint statement dated 6th April 2009, at paragraph 2, as follows:-

> *"If the Court finds that the Defendant has a liability for a delay to project completion and that that delay caused the entirety of the project costs (i.e. not activity related) to be extended by a similar period then the Quantity Surveying Experts have agreed the following rates are reasonably representative of the Claimant's on site overheads in the period (or any part of the period) from October 2002 to December 2002:*
>
> - *£38,000 per week for the Lostock and Rivington sites.*
> - *£35,000 per week for the Lostock only site."*

(Costain has limited its claim to £35,000 per week representing the Lostock site only.)

232. It is Haswell's submission that this passage in the experts joint statement is correct and submits that Costain has not satisfied the conditions set out in that extract in two respects. The first is that Costain has not established that the delays to the RGF and IW buildings in October 2002 – January 2003 in fact caused a knock on delay to completion of the whole project well over a year later. Secondly Haswell submits, independently of that objection, that Costain has not established by evidence that the delays to the RGF and IW buildings in fact caused delays to any other part of the Lostock site. On this basis, since the two pre-conditions to recovery agreed by the experts have not been fulfilled, Haswell argues that this claim must fail in its entirety.

233. Taking those points in turn. The experts have agreed that the delays to the RGF and IW were critical delays since those buildings were on the critical path of the project at the relevant time. Ordinarily therefore one would expect, other things being equal, that the project completion date would be pushed out at the end of the job by the same or a similar period to the period of delay to those buildings. However, as experience shows on construction sites, many supervening events can take place which will falsify such an assumed result. For example, the

Contractor may rearrange his programme so that other activities are accelerated or carried out in a different sequence thereby reducing the initial delays. Or the Contractor may apply additional resources to the delayed activities in order to accelerate them and thereby reduce the delay to those activities. Or, as in the present case, where the Employer was itself responsible for critical delays prior to the failure of the ground treatment works, it may be that extensions of time granted by the Employer cover part of the same period as delays under consideration. All of these are possibilities which need to be investigated in order to establish whether the assumption that a critical delay locked into the project in January 2003 does in fact lead to a delay to the completion of the whole project some 16 months later.

234. However in the present case the experts have not investigated the period after January 2003 in order to establish whether this was the case. In these circumstances the question for the Court is whether, on the balance of probabilities, Costain has established by evidence that the critical delays "locked in" to the programme by January 2003 did in fact result in precisely the same delay to the completion of the project some 16 months later

235. In a straightforward case where there was only one case of critical delay involved so that it was obvious that it must have caused the resulting delay to the completion date, the Court may be prepared to accept the logic of the position maintained by Costain in this case. However the present case is far from straightforward. The evidence shows there were many different causes of delay from the beginning of this job, some of which were accepted to be the responsibility of UU and some which were accepted to be the responsibility of Costain, e.g. the delays under consideration in this case. Still other alleged delays were disputed between the parties. It is known that, on the basis of, amongst other things, the delays to the work, Costain advanced significant claims against UU which were ultimately settled in the Supplemental Agreement for over £5 million. In the absence of any analysis of the interrelationship between all the operative delays from start to the finish, which is absent in this case, in my judgment it is simply not possible for the Court to be satisfied on the balance of probabilities that the assumption upon which this part of Costain's case depends, is correct.

236. I turn to the second pre-condition to recovery agreed by the quantity surveying experts, vis. that the delay to the RGF and IW buildings caused delay to all other activities on site. Costain has not called any evidence to show the relationship on site between the activity involving the RGF and the IW and the other activities going on at the same time or thereafter. It is known that there were 10 structures to be built on the Lostock site of which the RGF and IW buildings were 2. There is no reason to suppose that, as a matter of course, progress on the other 8 structures would be affected by delays to the RGF and IW. On the face of it is hard to see why that should be the case, since there would seem to be no reason why the other structures could not be constructed independently of the RGF and IW at least for part of their construction. If therefore, as seems likely, the other activities on the site were continuing regardless of the delays to the RGF and IW buildings, then there is no basis upon which it can be argued that Costain can recover the whole of its costs of maintaining the Lostock site simply as a result of delays to one part of that site. Since Costain is seeking to recover the totality of its site costs during the period October 2002 – January 2003, in my judgment, it follows that this claim must fail in the absence of evidence showing that, during that period, all the activities on the site were being delayed by delays to the RGF and IW. In the absence of that evidence, the only proper basis of claim left to Costain would be to show what were the prolonged site and

overhead costs referable only to the RGF and IW buildings which had been incurred over the period of delay. That would be a perfectly legitimate basis of claim.

237. As a fall back position, Costain puts its prolongation claim on this alternative basis and relies on the figures produced by Mr. Huntley (Haswell's quantum expert) which show that the tender value of the RGF and IW buildings accounted for about 13% of the tender sum. Applying that percentage to the agreed weekly rate of the totality of the Lostock site costs (£35,000) produces weekly site costs referable to these two buildings alone of £4,550. Applying that rate to the period of delay of 8 weeks, which I have found was Haswell's responsibility, produces a reduced claim for prolongation costs in the first delay period of £36,400.

238. On the same basis Costain also argues that it is entitled to recover 13% of the agreed inflationary cost of £6,000 per week i.e. £780 for 8 weeks = £6,240.

239. As indicated above I accept this alternative case advanced by Costain and, subject to the question of double recovery dealt with below, I would hold that Costain would be entitled to recover a total of £42,640 under this head of claim.

240. I wish to make it clear that this finding is no criticism of the approach and calculations of the programming experts. They both considered, correctly in my view, that the period to be assessed was the period during which the delays occurred and that is what they did. Having done so, they both concluded that critical delays, to differing extents, had occurred as a result of the foundation works. But they were never asked to investigate and did not consider whether or not those critical delays in fact carried through and led to the project completion date being pushed out to the same extent. Thus there is no way of knowing whether that is the case or not. Costain has not sought to establish by evidence that this was the case notwithstanding that is the basis of its prolongation claim.

4. Winter Working

241. For the reasons set out in this Judgment under the heading "Prolongation" above, I do not consider that the claim for winter working during the winter of 2003/2004 has been established on the facts and on the expert evidence. In my judgment this head of claim for prolongation costs fails in principle and accordingly there is no need to attempt to value it.

5. Head Office Overheads

242. Costain makes a claim to recover its head office overheads in administering and managing this project during the period of prolongation. On the basis of the actual overhead percentage of running Costain's business as a whole at the relevant time, Mr. Robins, Costain's Quantum Expert, has calculated the rate of £17,753 per week attributable to this project. Mr. Huntley, Haswell's Quantum Expert, cannot agree this figure and considers that some figure between £2,000 and £5,000 per week would be more appropriate.

243. However, this item is based upon the same premise as the prolongation costs themselves viz the premise that the whole of the site was delayed for the relevant period by reason of the delays to the foundations of RGF and IW. But, I have already found that there is no evidence to show what effect on all the other activities on the site, if any, the delays to the foundations of RGF and IW had. In other words Costain has simply failed to establish that the costs of running and maintaining this site as a whole from head office were extended at all for any period due to the

delays to the foundations. On that basis, in my judgment, the claim fails at the first stage, quite apart from the fact that I have found that Costain recovered £50,000 from UU in respect of this item over the relevant period.

6. Costs of Ondeo Degremont

244. Under this head Costain seeks to recover sums payable to OD on account of delays to OD's work caused by Costain. Insofar as the foundation works of RGF and IW are concerned, Costain alleges that the delays to completion of those buildings, caused by Haswell's defaults, had a knock on effect on OD's works so that Costain had to settle OD's claim for delay and disruption by making a payment of £850,000 based on a total of 36 weeks' delay caused by Costain. Mr. Robins has opined that settlement of OD's claim for delay on the basis of costs of £23,611 per week was reasonable. Accordingly, Costain now claims from Haswell for the period of delay found to be Haswell's responsibility multiplied by the figure of £23,611 per week. Mr. Huntley cannot accept Mr. Robins' figure of £23,611 per week and prefers the alternative figure of £15,000 per week but without providing any calculation or back-up for that figure. In cross-examination, Mr. Huntley conceded that a rate between his £15,000 and Mr. Robins' figure of £23,611 would be reasonable.

245. For legal support for this claim, Costain relies upon the well known legal principles which have been applied by the Courts on countless occasions since the seminal authority of Biggin -v- Permanite (1951) 2 KB 314. Most recently, the relevant principles were helpfully summarised by Akenhead J. in the case of AXA Insurance Plc -v- Cunningham Lindsay (United Kingdom) [2007] EWHC 3023 (TCC) as follows:

> *"(a) If there is no effective causal link between the breaches of a duty of the Defendant and the need for the Claimant to enter into the settlement with a third party or the payment of sums pursuant to the settlement agreement, there will be no liability to pay the settlement sums irrespective of whether the settlement was reasonable.*
>
> *(b) The onus of proof in establishing the reasonableness of the settlement is upon the Claimant. Thus, there must be some reliable evidence for the Court to conclude that it was a reasonable settlement.*
>
> *(c) The mere fact that the Claimant is not liable for the third party either at all or for the sums payable pursuant to the settlement, is not necessarily a bar to recovery or to the establishment of the reasonableness of the settlement. However, the fact that the Claimant was not liable to the third party either at all or for anything approaching the sums payable, may be a factor in determining that the settlement was unreasonable.*
>
> *(d) Where a settlement is not established as reasonable, it is still open to the Claimant to recover from the culpable Defendant, elements of the sums paid pursuant to the settlement of the third party to the extent that it can be proved that there is an effective causal link between the payment of those sums and the established breaches of duty. In those circumstances, it is legitimate for the Court to consider an establish what was likely to have been payable as a matter*

of fact and law to the third party as the foreseeable result of the Defendant's breaches."

246. The factual background to this claim can be briefly stated. It is set out in the witness statement of Mr. Peter Hardingham between paragraphs 54 and 69. Originally Costain's programme showed that the M&E works to be carried out by OD were programmed to be finished in September 2003. However that date was delayed due, in part, to the fact that the M&E works were 21 weeks late in starting. It was on this basis that OD made its claim for an extension of time and additional costs valued, as at November 2003, at £835,742. In early March 2004 OD issued a modified claim based on programme C004 which claimed a 36 week prolongation and costs assessed at a little over £2m. Mr. Hardingham states that Costain recognised that it had a liability to OD on account of the undisputed delays but did not believe that liability to be valued at over £2m. Accordingly, Costain set out to compromise OD's claim at the same time as it was seeking to compromise all its own claims against UU.

247. During conversations between Mr. Hardingham and OD's Commercial Manager, in March 2004, it was ultimately agreed that OD's final account would be valued at £8,900,000 of which a total sum of £850,000 represented recovery for OD's claim of 36 weeks' delay. Mr. Hardingham considered that, of those 36 weeks, the failure of the ground treatment works resulted in a total of 21.6 weeks' delay, made up of 16 weeks' primary delay plus the subsequent delay of 5.6 weeks caused by having to work through the second winter. In relation to the 21.6 weeks' delay, Mr. Hardingham assessed that OD was entitled to £510,000 on the basis of 21.6 divided by 36 x £850,000 = £510,000. A supplemental agreement recording this settlement was made between OD and Costain on 15 April 2004. Over two years later, on 17 July 2006, Mr. Hardingham drew up a file note recording the course of the negotiations with OD and how the sum of £510,000 in respect of 21.6 weeks delay had been arrived at. This step was taken so that the history of the matter would be recorded as Mr. Hardingham was on the point of retiring from Costain.

248. Costain now seeks to recover from Haswell damages representing the sums paid to OD under this settlement. The damages are calculated at the rate of £23,611 for every week of delay caused to OD by Haswell, being the weekly rate derived from the overall figure of £510,000 paid by Costain to OD. Mr. Crane was asked to comment on whether or not the start of OD's works would have been delayed as a result of the delays to the RGF and IW caused by Haswell. He answered this query as follows:-

> *"I therefore conclude that the M&E works activities which include the Ondeo Degremont works, would be affected in an identical manner as for the structural works delayed by the surcharge and piling issues as they are an integral part of the critical path between completion of these activities and the overall completion of the project."*

249. Haswell made a root and branch assault on this claim on the basis that it has not been proved. Haswell points to the striking lack of any references in the contemporaneous documents passing between OD and Costain of delays to the start of OD's works caused by the late availability of the RGF and IW. In fact in its claim document dated October 2003, **(F25/257)** in which OD claimed an extension of time of 21 weeks together with associated costs from Costain, although reference is made to the unavailability of work faces to OD, OD states as follows:-

"In accordance with instructions received from CL (Costain), DL (OD) attended site and commenced its installation activities on or about 16 December 2002 in order to meet the planned sequence of works noted in CL's C001 programme."

The C001 programme had been issued on 4 October 2002, before the decision to pile the foundations had been made. It follows that OD in fact commenced work on site in accordance with programme C001 so that its start on site was not delayed.

250. Haswell also points to a complete absence of any analysis carried out either by Mr. Bell and/or Mr. Hardingham who were directly involved at the time or by Mr. Crane subsequently. Such an analysis would show which of the work faces allocated to OD were available to OD and when. It must, of course be remembered, that OD's works covered both the Lostock and Rivington sites and, at Lostock alone, there were ten structures, of which this case only concerns two, for OD to work on. Without such an analysis, so Haswell argues, it is simply not possible to establish the extent of any delay caused by the late availability of the RGF and IW buildings. Without such an analysis Costain has simply failed to establish the necessary causal link between the delays caused by Haswell and any delays caused to OD. This is particularly crucial when OD was saying at the time that its works were delayed by a variety of factors of which the late access to work faces was only one. So far as Mr. Hardingham's file note is concerned, Haswell points out that this was written over two years after the events in question plainly in order to record the position to assist Costain in the pursuit of this claim. The note contains no attempt to identify and isolate the delays to OD's works caused by delays in constructing the foundations of the RGF and IW. Haswell also submits that, in cross-examination on Day 4, Mr. Bell had agreed that the RGF and IW were handed over to OD on time so that there was no delay at the outset. However, having carefully read the passages in the transcript on Day 4 (second session) at pages 24-27, I do not agree with that submission. It seems to me that Mr. Bell was talking about handing over to OD the areas of the works for wet and dry testing on time and not the work faces at the commencement of OD's work on site.

251. Finally the figure, supported by Mr. Robins, of £23,611 per week representing OD's weekly costs of prolongation, is entirely theoretical and merely an arithmetical calculation of the sum of £510,000 allegedly included in the settlement with OD divided by the period of delay. No attempt whatever has been made to show the validity of that figure and what items it includes. And, just as importantly, that figure must cover the whole of OD's site costs and not merely the costs referable to working on the RGF and IW. Yet there is no evidence to suggest that any delays to OD's works on those buildings had any knock-on effect on its other activities across the site.

Discussion and Decision

252. Over the many decisions of the Courts concerning the recovery of sums included in a reasonable settlement with a third party after the decision in Biggin -v- Permanite (1951), it has become clear that, where a Court is satisfied that a reasonable settlement has been entered into with a third party, it will not be too astute to deny recovery of the whole or part of that settlement against a culpable defendant. This is because it is the policy of the Courts to encourage sensible settlements of commercial disputes and the Court is well aware that such settlements are frequently made by busy commercial men under great time pressure so that, very often,

detailed paperwork showing precisely how the settlement sum has been arrived at is missing. All those factors are present in this case.

253. However there must be a limit to the leeway that a Court can give to a party seeking to recover from a Defendant a specific part of a global settlement made with a third party. The propositions quoted from the AXA Insurance Plc case above emphasise that, in order to be able to rely on the doctrine enunciated in Biggin -v- Permanite, it is essential as a first step, that the Claimant establishes a causal link between the breaches of duty on the part of the Defendant and the payment by the Claimant of certain sums under the settlement to the third party. In my judgment, in this case, that causal link has simply not been established to my satisfaction due to a virtually complete lack of contemporaneous evidence and/or later analysis which might establish it.

254. It is very striking that, in the contemporaneous documents, there are no references whatever to the fact that the whole of OD's works on site (or even a part of them) were in fact delayed by the late completion of the foundations of RGF and IW. The claims for extensions of time and recovery of consequent costs made by OD to Costain from time to time, referred to the absence of work faces in accordance with the programme but gave no further particulars. Further, OD itself in its October 2003 claim document said that it had started work on site on 15 December 2002 in accordance with Costain's C001 programme which had been prepared prior to the decision to pile the foundations. It must follow that OD's commencement of work on site was not delayed by the delays to the foundations of RGF and IW. Yet that was the very basis upon which Mr. Hardingham accepted that part of OD's claim was related to not being able to start work on site for about 21.6 weeks.

255. Also Costain has not attempted to deal with what I consider to be a major problem in presenting this claim, viz that the claim is based on the recovery of the whole of OD's site costs at the rate of £23,611 per week whereas, on any view, there is no evidence that any part of OD's M&E works other than those connected with the RGF and IW were in any way affected by delays to those buildings. Thus Mr. Robins' assertion that he considered that the rate for OD's weekly site costs was reasonable in the circumstances simply does not meet this point.

256. Further, the settlement made between Costain and OD was a global settlement of all OD's claims which included claims for variations and delay and disruption caused by a multitude of different causes. No attempt has been made to extract from the global sum paid, that part of that sum which is attributable to the delays caused to the RGF and IW buildings. That remains an unknown. Similarly, no attempt has been made either contemporaneously or later to show how the alleged delay relied upon by Mr. Hardingham of 21.6 weeks has been calculated. There is simply no information on the point beyond mere assertion by Mr. Hardingham.

Conclusion

257. For these reasons I have concluded that, although it is highly likely that the delays to the foundations of the RGF and IW buildings would have led to delays to the stage at which they could be handed over to OD to carry out their M&E works, there is no satisfactory material available from which the Court can be satisfied as to what was that period of delay. Further there is no material to establish what costs, if any, were incurred by OD as a result of the delays to the commencement of their works on those buildings. It may, for example, be that OD were able to re-programme their works to those buildings by working on the other eight buildings on

site so that the initial delays to those buildings caused them no overall delay or disruption. The absence of any attempt by Costain to show how the base figure of 21.6 weeks' delay is calculated or what are the constituent elements of the global settlement sum of £850,000 is a further shortcoming which, in my judgment, prevents a Court from being able to be satisfied, on the balance of probabilities, that any identifiable sum contained within the global settlement was referable to Haswell's breaches of duty. In these circumstances, I find that Costain has failed to prove the necessary causal link and, as a result, this claim must fail.

Settlement between Costain and UU

258. In February 2004, Costain entered into a Settlement Agreement with UU whereby its various claims against UU were settled for the overall Final Account sum of £31,017,000. That sum was only a little more than the figure of £31,025,000 which had been recommended to UU by Trett Consulting, who were asked to advise MWH, UU's Project Managers. Trett set out its findings in a report dated February 2004 which provided the basis for the recommendation for additional payment to Costain. In respect of Costain's claims Trett recommended settlement in the sum of £5,006,000 and in respect of Project Managers Instructions (PMIs) the sum of £2,340,000 was recommended for settlement.

259. It is Haswell's contention that some of the heads of claim now advanced itself by Costain were in fact claims for losses which had already been made against UU and therefore were recovered as part of the overall settlement. Accordingly, Haswell asserts that, on the authority of such cases such as Townsend and Another v Stone Toms [1984] 27 BLR 26 and, more recently, Bovis Lend Lease v RD Fire [2002] EWHC 939 (TCC) the Court should take into account sums already recovered by Costain so as to prevent double recovery when those same losses are being claimed against Haswell. Haswell does not put its case on the alternative basis that (with the exception of the claims made by OD) Costain had sought to recover from UU in respect of the delays and consequential costs to the works caused by the failure of the ground treatment. Mr. Hardingham said, and I accept, that Costain never made a claim against UU on this basis since it recognised that the responsibility for those matters lay with Haswell.

260. The following propositions emerge from the authorities cited above:-

(i) Where a Claimant needs to bring into account payments received from another party, in respect of the same loss, the Court will look at all available evidence in order to establish whether, and if so, to what extent, the Claimant has already recovered in respect of that same loss.

(ii) Initially the burden of proof in establishing a prima facie case of double recovery rests upon the Defendant who alleges it.

(iii) However, if the Defendant discharges that burden, it then shifts to the Claimant to establish that he in fact has not already been compensated in respect of the same loss. If the Claimant fails to do that, the Defendant's argument will prevail.

(iv) If the Claimant fails to put before the Court the relevant material and analysis necessary to establish whether there is, in truth, a potential double recovery, then the Court must resolve the issue doing the best it can on whatever material is available which it considers to be relevant. This exercise can place a heavy burden on the Court.

261. Those observations apply in full measure to the present case. Neither Costain nor its quantum expert, Mr. Robins, undertook this task in the first place, no doubt taking the view that it was a point for Haswell to raise if at all. For his part, Haswell's quantum expert, Mr. Huntley, raised this issue in his report by reference to the Trett Report. But he made no attempt to carry out an analysis in detail in order to establish where there might be double recovery and, if so, its extent. He concluded this part of his Report as follows:

> *"4.12 The Claimant gives no credit, to the Defendant, for these claim payments and there is no calculation to show how the Employer payments and the Claimant's claims in this matter relate or are discounted. It would be very helpful if the Claimant could have prepared an analysis to explain how their successful Employer claims, other sub-contract claims and their claim against the Defendant, all come together to properly show how the claims are apportioned."*

Of course it is far easier for a party in the position of Costain to do the necessary investigations and analysis than it is for a party in the position of Haswell, since Costain has the contemporaneous documentation and access to the staff involved at the time.

262. Perhaps spurred on by those critical words, on 7th April 2009, the last day of the hearing when the quantum experts were giving evidence, Mr. Robins produced Exhibit SR1 which is a table which seeks to apportion the total sum received by Costain under the settlement with UU against each of its claims. It also identifies where some of those claims incorporated the claims made by OD against Costain and it showed a notional recovery by Costain of sums which were referable to OD's claims against Costain. Helpful as this document is, it still does not seek to carry out an analysis of the sort suggested by Mr. Huntley, since it is a purely theoretical breakdown not based on any contemporaneous documents.

263. In the upshot, the only detailed analysis which was attempted was made by Counsel for Haswell in her closing written submissions. Counsel made a valiant attempt to provide the Court with rational argument and potential calculations to establish the extent of recovery in the settlement in respect of some of Costain's losses claimed against Haswell. I have found these submissions most helpful, particularly since there is no other comparable analysis to work on. Costain's closing written submissions did not deal with these questions so it was left to Costain's Counsel to respond orally to Haswell's submissions when oral argument was presented at the close of the hearing. During that argument, it was suggested that the quantum experts had agreed that, during the first prolongation period there was no overlap between the claims being made by Costain against Haswell and recovery from UU under the settlement. Accordingly the agreed figure for the cost of site overheads of £38,000 per week was net of any recovery over that period from UU.

264. But I do not see the matter that way. In the Quantity Surveying Experts' Joint Statement No. 2 made on 6 April 2009 (the day before they gave evidence), in respect of the first prolongation period experts record their agreement that the *"entirety of the project costs (i.e. not activity related)"* for the period October 2002 - December 2002 was £38,000 per week. There is no reference there to any agreement that this had already taken account of any recovery from UU

over the same period. It is true that the experts did agree the weekly site costs of £38,000 but, having examined the transcript of Mr. Robins' cross-examination on day 13, I am not satisfied that the experts made any agreement as to whether or not Costain had already been compensated for delays for which UU was responsible in the period October-December 2002. In relation to the second prolongation period (Winter 2003/2004) the experts specifically could not agree whether there should be any deduction for payments received from the Employer.

265. In these less than ideal circumstances, I now turn to the specific items identified by Haswell's Counsel which, it was submitted, gave rise to double recovery. In each case, I shall consider whether Haswell has discharged its initial burden of proof and, if so, whether Costain has satisfied me that there was, in fact no double recovery. Owing to the paucity of material available to the Court, I am bound to apply a rather broader brush than I would have liked but I do not see, on the authorities, that I have any alternative. That being so, I shall express my conclusions shortly without elaborate reasoning.

266. The first item relied upon relates to Costain's claim against UU for the sum of £52,370 under PMI 40. The claim related to the application of the additional one metre of surcharge allegedly applied in order to provide additional strengthening to the ground made necessary by the re-design of the RGF overflow required by the UU. PMI 40 also related to the alleged necessity to install an additional 64 piles in the RGF to support the additional loading caused by this re-design. However the state of the evidence on this item is not sufficiently clear for me to be able to find that there is probably an overlap between this item and other heads of claim on which Costain has succeeded, with the exception of the claim for the placement and removal of the 1 metre of additional fill. It appears that, in evidence on day 12, Mr. Huntley agreed that Costain was not required to give credit in its claim against Haswell for this item recovered from UU but I find that he was there referring only to the claim for the additional piles and not the 1 metre of additional fill as well. In the absence of a deeper analysis, I accept this evidence and I find that Costain is required to give credit under this item for the recovery from UU of £5,610 in respect of the 1 metre of additional fill.

267. The next item relates to prolongation costs. Haswell argues that UU accepted that it was responsible for prolongation costs of eight weeks during the period mid-October to mid-December 2002 and also accepted liability for the knock-on costs of working through the following winter of 2003/2004. Based upon the fact that, in the settlement, Costain recovered its prolongation costs in respect of 24 weeks delay, Haswell calculates that 8/24ths of those costs must be deemed to have been recovered in the settlement. The total sum arising from that calculation in respect of five separate heads of claim amounts to £961,285.

268. As already indicated, I do not think that the quantum experts ever agreed that Costain's claim against Haswell for its prolongation costs over the period October 2002 – January 2003 was calculated on a net basis, i.e. after taking account of any recovery from UU for delay over the same period. Accordingly Costain has not rebutted the prima facie case raised by Haswell to the effect that Costain has probably recovered its prolongation costs over this period already from UU. It appears to me that although Costain made no claim against UU on account of delays caused by the failure of the ground treatment works, nonetheless UU agreed to compensate Costain for delays caused by other causes for which it was responsible over the same period as the delays caused by the ground treatment failure. Since the prolongation costs were, in both instances, calculated on the basis of recovery of Costain's site costs and overheads, it follows

that, for the first prolongation period, if it were successful against Haswell, Costain would recover twice in respect of eight weeks of those prolongation costs.

269. However the picture, even after Counsel's attempts to clarify it, remains murky to my mind and the figures do not appear to me to be entirely reliable. In the absence of the assistance of the quantity surveyors on this point I have concluded that it would be right and fair to both parties if the total sum identified of £961,285 were significantly reduced to allow for the possibility that it might be overstated. Accordingly under this item I hold that credit should be given by Costain in the total sum of £500,000 in respect of the prolongation costs which it seeks to recover from Haswell for the first prolongation period. Since I have found that Costain would only be entitled to a total sum of £42,640 for this item, the required credit of £500,000 easily wipes out that entitlement.

270. The next item identified is that of head office overheads, profit and finance charges which were allowed in the Trett Report at the rate of 10% of the sums claimed. On this basis Costain must have been paid an additional 10% of the figure which I find they notionally recovered of £500,000, which amounts to a further sum of £50,000 which needs to be taken into account against the comparable element in the prolongation costs claimed.

<u>Sums recovered by Costain from UU in respect of OD's claims</u>

271. One of Costain's claims against Haswell represents a percentage of the total sum of £850,000 which it paid to OD in respect of its claims. Under this head Haswell seeks to argue that Costain must have recovered the sum it claims from Haswell already from UU since the settlement included value being given for OD's claims against Costain which it advanced against UU.

272. Exhibit SR1 produced by Mr. Robins during his evidence, is a notional breakdown by him of the settlement with UU which shows that the claims attributed to OD had been made in the total sum of £1,098,381 for which, in the settlement, Costain had recovered the total sum of £506,039. Since Costain had paid OD the total sum of £850,000 for its claims, this recovery left Costain short of £344,000 odd and it is that sum which Costain is entitled to recover from Haswell. Since its claim against Haswell under this head amounts to a mere £321,109, it follows that Costain can properly argue that it has not been compensated for any part of that sum and accordingly it can still pursue it against Haswell.

273. Haswell attacks this reasoning on the following basis. It depends on the assumption that the sum recovered on behalf of OD in the settlement bears the same relationship to the total sums claimed by OD as the total sums recovered by Costain bear to the total sums claimed by it. Haswell points out that, whilst this might be a useful rule of thumb, there is no evidence or compelling reason whatsoever why this should be so. When this was put to Mr. Huntley he dealt with it in trenchant terms as follows:-

> *"I mean if you look at some of these Costain claims, they put on the end of them some quite heavy percentages for preliminaries, for overheads and profit and I suspect that they could have been the first items to go and it may be that the subcontract elements of the claim were the parts that remain. So I don't want to mislead anybody but I think that, whilst this is a sterling piece of work, it doesn't really take you any further forward in knowing what the facts are in terms of a settlement for ODL" (Day 12, page 118).*

274. I accept Haswell's objection and Mr. Huntley's reasoning. I can see no reason whatever why it should be assumed that the actual recovery in the settlement in respect of OD's claims bears precisely the same relationship to the totality of the sums claimed as does Costain's recovery against its total claim. Costain's recovery in percentage terms differed widely from claim to claim and the overall percentage is merely an arithmetical result. It does not and cannot give any indication of the expected strengths of any one claim. So, to apply that overall percentage slavishly to the OD claims is in my view unjustified.

275. This is a case in which Costain accepts that it has recovered sums from UU on the strength of OD's claims but it is unable to specify which of OD's claims have been successful in the settlement and the amounts attributable to each of them. Costain also asserts that it has paid out £850,000 to OD in respect of OD's claims against Costain but, similarly, it cannot allocate any part of that global figure to the heads of claim made by OD for which Haswell is responsible. That is why, in my judgment, I have found that Costain's claim against Haswell to recover part of its settlement with OD fails. That being so, I find that Costain has failed to establish by evidence or otherwise that it has not been fully compensated in the settlement with UU in respect of a totality of OD's claims or, at the least, in respect of the value of £850,000 which it paid to OD in respect of those claims. Accordingly I hold that Costain's claim against Haswell in respect of the costs of the settlement with OD fails on this basis as well.

Quantum Summary

276. The results of my findings on Costain's financial claims are as follows:-

1.	Additional Construction Costs			£
	(i)	Excavating Contact Tank	-	Nil
	(ii)	Placement/Removal of 1 metre additional fill	-	Nil
	(iii)	Placement/Removal of additional 7,456m^3 of fill	-	Nil
	(iv)	Installation/Removal of Drainage Blanket	-	29,615.35
	(v)	Removal of Drainage Blanket (included in (iv) above)	-	Nil
	(vi)	Additional earthworks testing	-	3,488.16
2.	Cost of Piling		-	130,375.00
3.	Prolongation Costs		-	Nil
4.	Winter Working		-	Nil
5.	Head Office Overheads		-	Nil
6.	Costs of OD.		-	Nil
		TOTAL :		**£163,478.51**

INTEREST

277. Costain also claims interest/financing charges on whatever principal sum it recovers under this judgment. Since Costain does not operate its business on the basis of monies borrowed from its bankers, its loss, for which it seeks compensation by way of interest, reflects its inability to place the principal monies on deposit and earn interest as a result. Accordingly, in these proceedings, Costain claims to recover interest at the rate of half of 1% below Bank Base Rate which is the rate which it received on deposits. Unsurprisingly, this rate is agreed by Haswell.

278. So far as the period over which interest should run is concerned, Costain submits that the period should begin on 20 November 2002 when the bulk, if not all, of the monies, which it expended

and which it has recovered in this judgment, would have been defrayed. Haswell submits that this broad brush approach is not appropriate and that the Court should look at each successful head of claim separately and decide the starting date for the recovery of interest item by item. I do not accept this approach and consider that it is more sensible to adopt the conventional approach of assessing one starting date for the recovery of interest in respect of all successful heads of claim by adjusting that date so as to give a fair average starting date. In this case, Costain incurred its costs which it recovers in this judgment between about June 2002 and January 2003 when the additional piling works to RGF and IW were completed. Averaging these dates out, I conclude that the commencement date suggested by Costain of 20 November 2002 is about right and accordingly I hold that interest at half of 1% below Bank Base Rate should run from that date on the total sum recovered by Costain in this case. Thereafter, I also hold that interest at that rate should continue to run until the date of this judgment subject, however, to arguments raised by Haswell to the effect that interest should not run throughout the whole of that period on account of the fact that, so it is submitted, Costain was guilty of unreasonable delay in prosecuting these proceedings.

279. In this regard my attention has been drawn to the case of Claymore Services Ltd v Nautilus Properties Ltd (2007) BLR 452, a decision of Jackson J. sitting in the TCC. Having reviewed a large number of authorities on the topic, Jackson J. drew three propositions of general application from them as follows:-

> *"55. From this review of the authority, I derive three propositions:-*
>
> *(1) Where a claimant has delayed unreasonably in commencing or prosecuting proceedings, the court may exercise its discretion either to disallow interest for a period or to reduce the rate of interest.*
>
> *(2) In exercising that discretion the court must take a realistic view of delay. In the case of business disputes, litigation is for all parties and unwelcomed distraction from their proper business. It is no reasonable to expect any party to take every litigious step at the first possible moment, or to concentrate on litigation to the exclusion of all else. Delays should only be characterised as unreasonable for present purposes when, after making due allowance for the circumstances, it can be seen that the claimant has neglected or declined to pursue his claim for a significant period.*
>
> *(3) When determining what disallowance or reduction of interest should be made to mark the period of unreasonable delay, the court should bear in mind that the defendant has had the use of the money during that period of delay."*

In that case Jackson J. decided that, during the period in which he found that the claimant had been guilty of unreasonable delay, the rate of interest recoverable should be reduced by 50% rather than disallowing it altogether.

280. The parties have agreed a Procedural Chronology of this case which runs from 11 November 2003 up until 29 February 2008, when Costain served its Particulars of Claim. Haswell submits that that period of over 4 years is excessive and that, had Costain been pursuing its claim

reasonably, it would have been brought to trial much earlier. The agreed Chronology shows that, on 10 February 2005 Haswell wrote its second letter to Costain in which it denied liability for Costain's claims. The next step in the Chronology is on 7 September 2005 when Costain served its letter claim pursuant to the Pre-Action Protocol. Thereafter, the experts for the parties met and discussions took place between solicitors over the possibility of mediation. However, the next substantive step was not taken in the case until 19 January 2007 when a Pre-Action Protocol meeting was held between the parties. Thereafter mediation took place in August and October 2007 with the claim form finally being issued by Costain on 6 November 2007.

281. Counsel for Haswell has identified four periods during which she submits that Costain was responsible for unreasonable delay and so should recover no interest. I shall deal with each of those periods in turn.

11 November 2003 – July 2004

282. This period represents the period from the date of the first claim submission by Costain against Haswell which did not include a claim in respect of the failure of the surcharge mound up until 29 July 2004 when Costain made a further claim, for the first time referring to the failure of the surcharge mound. Haswell submits that there is no good reason why the surcharge claim could not have been made along with the others in November 2003. However during this period, the works were still proceeding on the ground and Costain was also heavily engaged in negotiating and settling its substantial claims against UU. As Counsel for Costain put it, Costain had its own business to run during this period and its attention was on other things. I accept this submission and hold that Costain was not guilty of any unreasonable delay during this period.

February 2005 – September 2005

283. This period of seven months elapsed between Haswell's second letter to Costain denying all liability and the date of Costain's letter of claim served pursuant to the pre-action protocol. It seems to me that, had Costain been intent on pursuing this claim, it could and should have served its pre-action protocol letter earlier. I would allow the period of three months as being reasonable for this letter to be served. Accordingly I hold that Costain was responsible for a period of unreasonable delay of four months during this period.

17 February 2006 – 24 November 2006

284. This period of about 9 months elapsed between the first meeting between the liability experts and the suggestion made on behalf of Haswell that a Pre-Action Protocol meeting between the parties should take place. During this period two further meetings between the experts took place and there were discussions between solicitors about the possibility of mediation. But nothing else to progress this case occurred. In my judgment Costain did act unreasonably in permitting these 9 months to pass with so little action taking place in the case. The last experts' meeting took place in April 2006 and I would have expected a serious litigant to get on with the Pre-Action Protocol meeting soon after that. I find that Costain was responsible for 6 months' unreasonable delay during this period.

January 2007 – August 2007

285. This period of a little under 7 months occurred between the date of the Pre-Action Protocol meeting and the first mediation held on 8 August 2007. Whilst I recognise that, as Counsel for Costain put it, *"it takes time to organise a mediation"*, I consider that the time taken by Costain

was considerably too long once it was clear that the process of mediation was the next step to take. At the latest I would have expected a mediation to have been capable of being organised within a period of 5 months after the Pre-Action Protocol meeting. Accordingly I find that Costain was responsible for a further period of 2 months' unreasonable delay during this period.

286. It follows that the total period in which I find that Costain unreasonably delayed the progress of these proceedings was 12 months during the period February 2005 to August 2007.

287. I must now decide whether it would be appropriate to deny Costain the recovery of all interest during this period or, alternatively, to reduce that recovery by a percentage, for example, 50%, as was done by Jackson J. in *The Claymore Services Ltd* case. Notwithstanding some conceptual difficulties which I see in reducing interest rather than disallowing it during a period of unreasonable delay, nonetheless, in this case, particularly since the rate of interest claimed by Costain is substantially lower than the ordinary commercial borrowing rate, I am prepared to reduce the interest recoverable by 50% rather than eliminating it altogether. Accordingly I hold that, during the period identified above, amounting to a total of 12 months, Costain is entitled to recover interest on its damages at the rate of 50% of the ordinary agreed rate. As indicated above, interest will run from 20 November 2002 until the date of this Judgment and I invite the parties to attempt to agree the appropriate interest calculation, failing which the Court will undertake it having received submissions from the parties.

COSTS

288. This case took the following course:-

(i) Costain's initial claim was for the sum of about £3.5 million and this was progressively reduced so that, by 7 April 2009 (the last day of evidence) the claim amounted to a total of £1,257,377 (exclusive of interest).

(ii) The case has occupied the Court for 14 sitting days and the combined legal costs of the parties amount to about £2.9 million.

(iii) No payment into court or Part 36 Offer to pay any sum to Costain was ever made by Haswell.

(iv) Costain has recovered a total of £163,478.51 (exclusive of interest) by way of damages from Haswell.

It is hardly surprising that, in the circumstances, the parties have made detailed submissions both in writing and orally, as to the appropriate costs order for the Court to make. On this issue alone, the Court was handed a file of 14 authorities dealing with orders for costs, of which I was referred to about 9. This is quite understandable since, as things have turned out, the Court's order as to costs will affect the financial position of the parties far more than the decisions on liability and quantum since the sum recovered by Costain is small by comparison with the sums expended on legal costs.

289. In the light of CPR Part 44.3, I shall deal with the parties' submissions on costs in a number of stages.

Who was the Successful Party?

290. In reliance upon cases such as AL Barnes Ltd v Time Talk (UK) Ltd [2003] EWCA Civ 402, Johnsey Estates v Secretary of State for the Environment [2001] EWCA Civ 535, Hall v Stone [2007] EWCA Civ 1354, Straker v Tudor Rose [2007] EWCA Civ 368 and upon two recent cases in the TCC vis. McGlinn v Waltham Contractors & Ors [2007] EWHC 698 (a decision of Coulson J.) and Biffa Waste Services Ltd v Machinenfabrik Ernst Hese GmBH [2008] EWHC 2657 (a decision of Ramsey J.), Costain submits that it was clearly the successful party. It was vindicated on issues of liability and it recovered a not insignificant sum by way of damages. In the light of the refusal by Haswell to make any substantive offer of payment to Costain, Costain, it is submitted, had no alternative but to proceed with the case and that decision was vindicated by the result. Accordingly it should recover all its costs from Haswell.

291. On the other hand, Counsel for Haswell submits that Haswell was the successful party and should recover its costs. Reliance is placed on the decision of the Court of Appeal in Roache v News Group Newspapers Ltd [1998] EML 191 in which Sir Thomas Bingham MR, after referring to a number of authorities, said:

> "*The upshot of these cases is in my judgment clear. The Judge must look closely at the facts of the particular case before him and ask: who, as a matter of substance and reality, has won? Has the plaintiff won anything of value which he could not have won without fighting the action through to a finish? Has the defendant substantially denied the plaintiff the prize which the plaintiff fought the action to win?"*

He concluded that the plaintiff had won nothing of value and that the defendant had substantially denied the plaintiff the prize he had fought the action to win and he made a cost order accordingly.

292. Haswell also relied upon the case of *Islam v Ali* (2003) EWCA Civ. 612 in which the Court of Appeal held that, although the claimant had succeeded in recovering over £12,000, in reality the defendant was the winner here since the Court had dismissed the claimant's case save for its right to recover a reasonable sum for his services, which the defendant had never denied. In those circumstances the Court made no order as to costs. Miss Jefford QC submitted that, in substance, Haswell was the winner since not only had it succeeded on many issues of prolongation and quantum, but also it had reduced Costain's recovery to a small fraction of its claim which itself had been drastically reduced as the case progressed. Miss Jefford QC submitted that, in reality, Costain had recovered little of value in comparison to what it was seeking and that Haswell had been unable to make a payment into court because Costain's quantum claim was never properly explained until shortly before the hearing began and was a moving target in any event.

Decision

293. Based on the authorities to which I have been referred and which post-date the commencement of the Civil Procedure Rules, I have no doubt whatever that Costain is the successful party in this case. It is true that its claim has been drastically reduced but, nonetheless, it has recovered a sum of money which is substantial. Whilst Costain's claims have turned out to have been inflated, and, in the early stages of these proceedings, they can be described as *"exaggerated"*, they failed, not because they were advanced for more money than they were worth but

because the facts necessary to prove those claims were not put before the Court. In any event, even if the claims could properly be described as *"exaggerated"* all along, it was always open to Haswell to make a payment into Court or a Part 36 offer, which procedures are designed to protect a Defendant in this position. I find that Haswell had no sufficient grounds for not being able to protect itself in this way and, on the contrary, I find that Haswell took a hard line throughout based, no doubt, on its expectation that it would succeed on liability. But that is not a good reason for failing to make even a modest offer to settle the case since, as everyone experienced in this field knows, litigation is an unpredictable pursuit.

294. So far as the case of Roache v News Group Newspapers Ltd is concerned, as Coulson J pointed out in the McGlinn case, that case was decided before the CPR came into effect and there is no post-CPR authority which follows it. On the contrary, all the post-CPR cases that I was referred to (with the exception of Islam v Ali) adopt the slightly different approach which I have set out above. Islam v Ali itself was plainly decided on its own facts from which the Court of Appeal concluded that the Defendant had indeed been the winner. On issues of costs, it is axiomatic that each case turns heavily on its own facts against which the Court's discretion must be exercised. On the facts of this case, I have no hesitation in holding that the threshold issue of which party is the successful party must be resolved in favour of Costain.

Costain's conduct

295. Even if Costain should properly be regarded as the successful party, Haswell submits that Costain's recovery of costs should be reduced on account of various aspects of its conduct during the proceedings. These will be considered in turn.

(i) Exaggeration of the claim

296. Haswell submitted to the Court a schedule showing the sums originally claimed by Costain in its Particulars of Claim under each of the heads of claim brought compared with the reduced sums claimed as set out in the Second Joint Statement of the Quantum Experts dated 6th April 2009. This comparison shows that, in the Particulars of Claim, Costain claimed a total of a little over £3.5 million whereas in the Second Joint Experts' Statement that sum was reduced to a little over £1.5 million, a reduction of £2 million in round figures. (These figures include finance charges). Of course some of these reductions resulted from the evidence given at the hearing but, even before the hearing began, Costain's claim had reduced to about £1.8 million (including finance charges), a reduction of about £1.7 million from the initial claim. In my judgment these facts do demonstrate that initially Costain's claim was significantly exaggerated in that the claim was approximately halved before the trial even began. In the absence of an explanation for this reduction, I think it is right to conclude that Costain's claim was initially exaggerated to a considerable extent.

(ii) Raising and pursuing claims when it was unreasonable to do so

297. Haswell points to a number of ways in which it was suggested that Costain argued its case in ways which were unreasonable and/or misconceived. Three examples are relied upon, the way the piling costs were claimed, the way most of the prolongation costs were claimed and the winter working claims. So far as the first two items are concerned, I do not consider that it was unreasonable for Costain to pursue those heads of claim in the way which it did. It so happens that I have found that the way those claims were pursued was incorrect to some extent, however, nonetheless, those claims have succeeded in part. It is true that the way that the prolongation costs were claimed failed through the lack of the necessary evidence but,

nonetheless, Costain did recover prolongation costs calculated on a different basis, albeit that recovery was found to have been a double recovery.

298. As far as the winter working claims are concerned, I do find that it was unreasonable for Costain to bring and pursue those claims since it had virtually no evidence to support them. When questioned about this, Costain's expert, Mr. Crane, seemed to me to be a little embarrassed in supporting these claims which he only did faint heartedly. It would, to my mind, have been better if these claims had never been advanced at all.

(iii) Offers to settle

299. Haswell also argues that Costain maintained an unreasonable attitude towards the sums it would accept by way of settlement, thereby making settlement of the case impossible. On 10 March 2008, Costain made a without prejudice save as to costs offer under Part 36 to accept the total sum of £1.89 million (including interest). This offer was not accepted by Haswell. Again, on 29 January 2009 Costain made a further offer without prejudice save as to costs to accept in full and final settlement the sum of £1.76 million (including interest and costs). On the same date, Costain made an offer under CPR Part 36 to accept the total sum of £1,150,000 plus costs. Neither of these offers was accepted by Haswell which, on 13 February 2009, made a counter-offer to *"drop hands"*, i.e. each party to withdraw its claims and bear its own costs. This counter-offer was summarily rejected by Costain on 23 February 2009 as being *"unrealistic"*.

300. Haswell now describes Costain's conduct in this respect as being *"wholly unreasonable"* in that it put its demands far too high and, had it not done so, a settlement might have been possible at a much lower figure. Haswell also points out that, had Costain accepted its *"drop hands"* offer on 13 February 2009, from a financial point of view it would have been much better off than it will be now in the light of its very limited recovery in this case.

Decision

301. I do not consider that Haswell has shown that Costain acted unreasonably in making the offers which it did and in refusing Haswell's *"drop hands"* offer. Costain progressively reduced its expectations by making the offers it did and its final offer to accept £1.15 million plus costs does not seem to me to have been unreasonable looking at the case through the eyes of Costain at that time. Of course Costain has recovered a lot less than that sum by way of this judgment but that is how litigation very frequently goes and it is notorious how difficult it is to predict with any degree of precision the outcome of a contested hearing. On the contrary, as I have mentioned above, I consider that Haswell itself, when faced with serious allegations of negligence and very large claims for damages, never attempted to liquidate its potential liability by making any substantive offer to pay compensation to Costain. There is of course no way of knowing at what level Costain might have been prepared to settle the case had Haswell made a significant offer to settle and to speculate on that question would not be helpful. However I do not consider that Haswell acted reasonably in rejecting Costain's offers of settlement out of hand without coming back with some form of substantive counter-offer.

Partial Success/Issue based Costs Order

302. Haswell submits that since Costain failed on a large number of contested issues, Haswell's success in that regard should be reflected either by reducing Costain's costs recovery significantly and/or by making some award of costs in Haswell's favour to reflect that success. It

is thus necessary at this stage to summarise the issues upon which Costain has succeeded or failed.

303. The major issues upon which Costain succeeded at trial were:

- All liability issues except the claim in respect of the alleged strict liability of Haswell.
- The claim for prolongation of the RGF and IW Works for a period of eight weeks.
- In respect of quantum, of the eleven heads of claim listed in the quantum summary earlier in this Judgment, Costain succeeded on four of those heads of claim amounting to a total recovery of £163,478.51.

304. The issues upon which Costain lost were the following:-

- The claim for prolongation costs to the whole site of twelve weeks.
- So far as quantum is concerned, Costain lost altogether on seven of its eleven heads of claim which included the great majority, in terms of value, of Costain's monetary claims.

305. In my Judgment, and, looking at the matter in the round, I estimate that the issues of liability and prolongation of the works in principle upon which Costain succeeded took up approximately 60% of the time taken at trial. So far as the quantum issues upon which Costain succeeded I estimate that they took up about 5% of the time at trial. That means that the issues upon which Haswell succeeded occupied the time of the Court for about 35% of the trial. I also consider that the time taken in preparation of this case can be properly allocated in the same proportions.

306. In considering what is the most appropriate approach to be taken by the Court in the present situation and then what is the most appropriate costs order to make, I have been greatly assisted by two recent decisions of the TCC viz McGlinn v Waltham Contractors Limited and Others [2007] EWHC 698 (a decision of Coulson J.) and Multiplex Construction (UK) Limited v Cleveland Bridge UK Limited (2008) EWHC 2280 (a decision of Jackson J.). I have found paragraphs 81-89 of the Judgment in the McGlynn case to be particularly helpful on the question of the desirability of making costs orders based upon the respective success or failure of the parties on distinct issues. I adopt with gratitude the summary of the applicable principles contained in paragraph 89 of that Judgment.

307. From these authorities, and from a consideration of the many authorities referred to within them, it is clear to me that the present approach of the Courts in cases similar to the present one, is to reflect the relative success or failure of the parties on the issues in the case by a modified costs order. Thus the time-honoured rubric that *"costs follow the event"* is no longer applied automatically in this kind of situation even though a clear winner of the litigation has emerged. The Court nowadays is encouraged to enquire more closely into the relative success or failure of the parties and to adjust its costs order in favour of the winner of the litigation accordingly. It seems to me that that approach is particularly appropriate to the present case even though success or failure on the three main groups of issues, liability, prolongation and quantum is not clear cut.

308. Taking all the above matters into account were conduct not an issue, I would conclude, in very broad terms, that Costain was entitled to recover 65% of its total costs liability of about £1.6m and that Haswell should recover 35% of its costs incurred of £1.3m. But, after taking the conduct of the parties, which I have found to be relevant, into account, I would reduce Costain's recovery from Haswell by 10% to a figure of 55% and I would reduce Haswell's recovery from Costain by 15% to 20% of its costs.

309. Rather than requiring the parties to have two assessments of their costs if they cannot be agreed, it seems to me appropriate to net off these proposed orders to produce a reduced percentage of its costs payable to Costain by Haswell. Since I have been provided with estimates of the parties' total costs, which do not appear to be in dispute as estimates, I can carry out the netting off process with reasonable confidence that it will produce a fair and just result. Accordingly netting off 20% of Haswell's estimated costs from 55% of Costain's estimated costs results in the notional sum of £620,000 being payable by Haswell to Costain in respect of Costain's costs. That figure represents about 38.75% of Costain's total costs expenditure of some £1,600,000. Stepping back from these calculations and looking at the matter in the round, I consider that the recovery by Costain of some 38.75% of its total estimated costs is a fair and just result in all the circumstances of this case.

310. In addition Costain seeks orders from the Court for interest on its costs incurred under CPR Part 44.3(6)(g) and also a payment on account of its entitlement to costs under CPR Part 44.3(8). So far as interest is concerned, I was told that Pinsent Masons, Costain's present solicitors, were first instructed in this matter in July 2005 and that Costain has been making regular payments to that firm on account of its costs liability. Bearing in mind that Costain's costs accumulated over the period from about July 2004 when this claim was first intimated to Haswell up to the present date, it would seem to me to be appropriate to award Costain interest on whatever turns out to be its costs recovery from 1st June 2008 until the date of this Judgment. I have taken that period since the overwhelming majority of the costs of Costain's costs in this matter will have been incurred after the Particulars of Claim were served so that its recovery of interest should reflect the fact that it will only have been out of pocket as to the great majority of its costs after that date. Interest will be recoverable at the usual commercial rate from that date until the date of this judgment.

311. So far as a payment on account of costs is concerned, Costain invites the Court to order a payment of 50% on account of its final costs entitlement at this stage. That figure seems reasonable and on the basis that its net cost entitlement, on the present figures, will be somewhere in the region of £620,000, I order an interim payment on account of costs in the sum of £300,000. I shall also order that Costain's costs should be assessed on the standard basis of assessment unless they are previously agreed between the parties.

Overall Conclusion

312. As the result of this judgment there will be Orders that:-

(i) Haswell must pay to Costain the principal sum of £163,478.51 together with interest to be assessed, as from 20 November 2002, within 14 days of the interest amount being agreed or ordered.

(ii) Haswell must pay 38.75% of Costain's costs of this case to be assessed on the standard basis, if not agreed, together with interest on such costs calculated from 1 June 2008 to the date of this judgment.

(iii) Haswell must pay to Costain with 14 days from today the sum of £300,000 on account of its costs liability.

RICHARD FERNYHOUGH QC
(**Sitting as a Deputy High Court Judge)**

24 September 2009