



What a load of scrap!

Ground conditions: Who takes the risk?

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The portly, cigar-smoking, red-faced construction director grimaced, fuming at the collection of discs, girders, bars, channels and other assorted lumps of rusted and decayed metal which had, an hour earlier, mangled the cutting discs and scrapers on his brand new, state of the art, tunnel boring machine (TBM), nicknamed Tabatha, delivered a couple of days earlier and costing a cool £5m. To say he wasn't happy would be something of an understatement! The early-morning quiet turned blue with expletives. This would cost them a whole new set of cutting discs/scrapers for the face of the TBM; a complex operation which required the removal and replacement of the front flood doors, a reversal of the machine from the cutting face back to the launching shaft so that the necessary repairs could be effected, several days downtime for the tunnel-kings, his tried and tested gang of mining engineers who travelled the world with him constructing all sorts of magnificent tunnel bores and, most importantly of all, a critical delay to the already compressed construction schedule. This was turning into a very bad day at the office!

THE PROJECT QS examined the scrap metal, took photos and prepared for the oncoming battle

over that oft-tested old chestnut... clause 12, when engineer and contractor engage in the ubiquitous battle of unforeseen ground conditions. Subsequent testing and investigations found that the corroded, stagnant mass of assorted steel was none other than the well-buried remains of a train; a 1930s steam engine to be precise. What the decaying remnants of that once majestic vehicle were doing, buried nearly 9m down under one of the city's busiest thoroughfares, is anyone's guess. The geologist reckoned that it had been dumped long before the new road had been built; when the embankments skirting the mighty river that ran the length of the city were constructed atop the viscous and unpredictable duo of rock and slurry that underlay, randomly, the hinterlands of that stretch of river. Then it had simply sunk over the decades, colliding with, altering and bringing with it remnants of substrate rock outcrops as it went.

The big question was: Should the contractor have reckoned on encountering such things in the line of its new tunnel? True, there was evidence of an old railway yard having existed in years past, on part of the land requisitioned for the tunnel line — but some miles further up the line — so, was it within anyone's reasonable contemplation that parts of a train would sink in the muddied flats to such a depth?

Reasonable foreseeability is a very subjective test to apply, but the one which is most often used. It has been mooted that between 25% and 50% of construction contracts suffer delays caused by the contractor encountering unforeseen ground conditions. This compares to the average site investigation costing around 2% of the capital cost of the works. These reports are often undertaken before the client has decided on the scope of the intended development and the available budget often dictates that the investigation is not sufficiently comprehensive to provide a representative analysis of the ground conditions which will be encountered during construction. Consequently, the report is often of minimal value to tenderers.

In the case of our riverside tunnel (described above), the site investigation carried out by the local authority was both voluminous and intricate, having been carried out by a leading firm of geologists in that region. However, to paraphrase its detailed conclusions, it was unable to ascertain with any degree of certainty, the predicted conditions likely to be encountered, even in a short stretch of tunnel, at any cross-sectional point in the bore. So it warned the users of the information that the predicted results were unreliable and that significantly different conditions might be encountered randomly. Armed with such information, how is a contractor to price such risk?

Generally, if a contractor has undertaken to execute work for an agreed price, it is bound to do so; irrespective of how difficult it is, unless a mechanism for relieving this liability is incorporated in the contract. In the Victorian case of *Bottoms v Mayor of York*¹, the contractor encountered very poor ground conditions when constructing a sewage works. Since there was no express warranty

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regarding the type of ground conditions, it was held that the contractor was not entitled to any additional payment. Thus the principle was enshrined that in a contract which is silent in respect of liability for ground conditions, the risk of encountering these is borne solely by the contractor.

Standard forms differ in their approach. Those intended for engineering projects (such as the ICE and NEC forms) where there is often substantial interaction with the ground, apportion some of the risk onto the employer. Under the ICE form, the test for ascertaining if relief is given to the contractor falls under clause 12, which requires physical or artificial obstructions to not have been reasonably foreseeable by an experienced contractor.

By contrast, JCT, the standard contract for building projects, makes no express provision for dealing with ground conditions, but where the contractor encounters physical conditions which are substantially different from those contemplated by the contract documents and can be shown to be so, then the variation and loss and/or expense provisions entitle the contractor to recover the additional cost of the changed circumstances. Even where there is express relief in the contract for unforeseen ground conditions, the contractor may find it difficult to obtain relief for these.

In an urban trunk road project in southern England, constructed in the early 1990s, Victorian houses fronting a side road had basements with gratings at pavement level. Despite the lengthy period over which the design and tender documents had been developed, these basements were not referred to in the information provided to tenderers. The contract was under the ICE 5th edition, under which clause 11 deems the contractor:

“...to have inspected and examined the site and its surroundings and to have satisfied himself before submitting his tender as to the nature of the ground and sub-soil (so far as is practicable and having taken into account any information in connection therewith which may have been provided by or on behalf of the employer).”

Early in the construction period, the contractor uncovered these basements. The works were delayed whilst the engineer considered how best to deal with these and subsequently gave instructions to deal with the basements. The contractor gave notice under clause 12 of its intention to claim the cost of delay and disruption incurred as a consequence of encountering these basements. *Prima facie* this was a clear case of the contractor being entitled to relief under the contract. However, the engineer initially rejected the contractor's clause 12 notification on the basis that, under clause 11, the contractor had clearly not visited the site and made due allowance for these basements in its tender, thereby ignoring the omission of any reference to these basements in the contract documents. Only after extensive negotiation, at which the engineer was reminded of its impartiality under the contract, was the contractor granted this relief.

This case, it might be argued, highlights a cultural flaw in the treatment of contractors and subcontractors by contract administrators that harks back to Dickensian times and is rooted in the class system endemic of that era. The redress of such imbalances in risk apportionment has been at the root of initiatives over recent decades including Latham and the development of the NEC/ECC principles. The hypocrisy of an invitation to tender which expects the tendering contractor to accept full liability for risks which the employer and its team of experts is unable to identify or quantify is self-evident.

Our experience suggests that, rather than take on board the ethos and principles of balanced risk apportionment and NEC management principles, most employers are increasingly amending standard forms such that the contractor is expressly liable for changed physical conditions or artificial obstructions encountered during construction.

One example of this was the removal of clause 12 on an ICE contract to remediate a small brownfield site on which there had been substantial mining activity; much of this being from medieval times and thus unrecorded. The contract drawings indicated the presence of 72 mineshafts which needed treating but the contractor encountered in excess of 1,300, which required a fundamental

change to the method of working, a three year overrun on a 12 month contract and cost escalation in excess of 300%. As the employer was unable to ascertain the presence of these additional mineshafts, over 1,200 of them, why should the contractor be burdened with this unreasonable degree of risk?

In another case, which required the upgrading of a 150-year-old Victorian railway infrastructure, the contractor was made expressly liable for ground conditions and required to warrant that the condition of aged brickwork was to the same standard as 21st century new build works. Since no ground information was available and some of these structures had been buried in the 1850s and had not seen the light of day since, it is difficult to see how the contractor could reasonably accept these obligations.

This approach to procurement is presumably intended for the employer to achieve 'cost certainty' in tenders and to leave minimal opportunity for contractors to recover additional money over and

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above their original price. However it seems to be completely contrary to the principles of the Latham and Egan reports which were essentially to encourage team working and to discourage the adversarial approach to contracts. Whilst greater cost certainty may be achieved by this 'risk dumping' approach, the reality is that the contractor will almost certainly price the risk into its bid, hence the employer would pay irrespective of whether the risk manifested itself. Moreover, the price which the contractor will formulate, faced with a totally unforeseeable and/or immeasurable risk, is likely to be exaggerated out of all proportion to the real risk and little more than a best guess.

With relief for unforeseen conditions incorporated into a contract, the employer will only pay in the event of such conditions occurring. We, as an industry, have become irrationally obsessed with the concept of cost certainty, to the exclusion of all other methods of managing such risks. The original concept of the contractor bearing the risk for all physical conditions, irrespective of their foreseeability, was formulated in an age

when engineering expertise, construction techniques and methods of geological and geotechnical investigations were positively archaic in comparison to today. This, arguably, made the contractor the only party capable of managing these 'unforeseens'. Coupled with the refusal of employers or

engineers to treat the lowly contractor with anything approaching a reasonable degree of equality, we've been left with the legacy of construction and engineering related legal disputes that became endemic of the construction industry throughout the preceding two centuries. Judging by recent experience, clients and contract administrators still seem incapable of grasping the nettle when it comes to any semblance of balanced risk management. They appear to be more intent on obtaining a fixed price; irrespective of its degree of unreliability.

Given the pressures on contractors in the current market, this strategy is a recipe for disaster in terms of project delivery. A fundamental principle of risk allocation is that a risk should be borne by the party best able to deal with it. Tender periods are often of very short duration and consequently there is minimal opportunity for a tenderer to undertake substantial extra investigation of the ground during this period. By contrast, the planning or design stage of a project can last years and thus the employer has substantial scope for procuring a comprehensive and meaningful ground investigation. For projects where there is a substantial risk from interaction with the ground, the employer must commission a comprehensive ground investigation in order that all parties have the best available knowledge as to the underlying soil conditions.

The risk of the contractor encountering conditions which were not reasonably foreseeable should be borne by the employer (as under the ICE and NEC forms) in the knowledge that contractors would not need to price in an inflated and uncertain

contingency for unforeseeable conditions, since in the event of encountering these, relief would be available under the contract. More importantly, however, engineers and contract administrators must approach the assessment of reasonable foreseeability with a more balanced judgment.

Our tunnel project was resolved after the mother of all battles in the negotiating room (though from a purely professional viewpoint, we would have liked to have tested the theory before the courts... perhaps another day). We argued successfully that in assessing reasonable foreseeability there must be a 'horizon of contemplation'; a point at which, objectively viewed, no reasonable person could be expected to see beyond. That point is to be judged in all cases by reference to the information available, the degree of access to information, the options available to the contractor for conducting its own further site investigation and the time available to the contractor to process and interpret such information.

The horizon should extend, we argued, not to all possible interpretations of the information available, irrespective of their rationality, but to all probable interpretations. Our portly construction director calmed down, lit another Hamlet and had one of the GOs rescue the nameplate from that train and clean it up. After a bit of elbow grease and polish, it came up quite nice. Look out for it over the desk of the next construction director you happen to visit.

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¹ (1892) *Hudson's Building Contracts* (4th Ed) Vol II p208