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Abstract

This paper shows on a twofold perspective how a well prepared, certified and ethically responsible construction cost management professional can have a key role in avoiding construction related disputes as well as, if unavoidable or already happened, in the determination of the most accurate and timely representation of such costs. Based on a wealth of previously accessed literature and my own professional experience, this paper also shows the importance of such professionals in the substantiation of costs in a construction dispute resolved through international arbitration.

By including examples of real cases, to the extent that confidentiality allows, the paper details how construction cost consultants could have been involved in the avoidance of such cases and also how their participation in the substantiation of the actual costs was relevant in specific cases.

By being both real fact and better practice based, the paper presents the importance of total cost management professionals that devote a lot of their time to help organizations and projects to ensure costs are accurately identified, measured, and timely reported. By being the guardian of costs in large construction projects, these professionals are responsible for the generation of information that is ultimately used as the basis for decision making and as such, have a key relevance on decisions that impact many times a multitude of stakeholders.

It demonstrates also that applying cost management standards, such as the TCM, contributes to the development of businesses on a sustainable way proving that a well-coordinated study, expert report and testimony may provide for clearer, more straight forward view of the actual costs incurred on construction as well as it provides for an increased assurance over who is responsible for such costs.

At last the paper shows how these professionals may be of incredible relevance in avoiding the very root causes of the disputes by recommending, drawing, implementing and operationalizing best practice and customized practices on the management of large capital projects’ risks. Thus, this paper presents details to owners, contractors, engineers, contract managers and all other construction related professional that may be involved in large disputes which will eventually be (or have been) resolved through international arbitration.

Conclusions

Construction cost disputes may be avoided if the right Construction Cost Specialists are involved in construction projects at the right time, however, when the disputes are unavoidable and an international arbitration is initiated for resolving the differences between the parties, these very same professionals will be the better
prepared specialists to assist in the resolution of such disputes.

Keywords: construction, cost management professional, construction dispute.

INTRODUCTION

In order for someone to manage anything, he/she will first need to identify it, measure, plan and pretty much deal with all key aspects of it. In construction cost management, the existing facets to be managed can be endless and it is highly dependent on a world recognized triple constrain which includes Cost, Time and Scope. This means that to properly manage costs in a construction project, someone will need to understand which are the different aspects of the project, how these interact to each other and how they are deeply involved with one another. Construction cost specialists are the professionals in the construction management industry the best positioned to undertake this challenge as they are trained, qualified and experienced on the peculiarities of such intense projects.

I like to make a practical comparison and who has had the opportunity to go through a small construction to renovate or redecorate their homes will know that is 100% correct. Small renovations more often than not go overtime and ultimately cost more than originally budgeted. One could calculate how smaller these projects are when compared to large capital expenditures and then multiply the amount of issues you faced in the smaller projects by the same ratio and you will find how many and how relevant will be the problems that will occur in a larger construction project. These projects have too many different specialties involved, too many interests at stake and their execution must be extremely well coordinated in order to avoid clashing interests, actions and decisions. And even when a construction project is well planned, changes happen all the time and very commonly the results of such these changes end up materializing as additional cost and time to the project.

As they are the ones getting direct involvement with all other construction project areas/professionals throughout the project lifecycle, construction cost management specialists have not only the opportunity but the professional duty to assist the overall management of projects to the best of his/her ability. As they know that every and each impact on the project will likely end up affecting his “project numbers”, they have a vested interest in assisting the project teams in getting the management of construction projects right from the beginning and this should will help minimizing potential impacts on construction costs.

By undertaking their role in the management of construction projects, construction cost specialists become a player that can effectively and efficiently assist the entire project avoiding construction related claims. For instance, the correct measurement and monitoring of actual construction costs against planned costs can be used as a powerful tool against claims that are generally dealt with when it is already too late for any corrective action. This means that by been proactive, these specialists can help construction projects been delivered on time, on scope and on cost. I would go further and state that construction costs specialists have an ethical duty to diligently assist the management team to deliver such projects within time, scope and budget costs.

At last, but surely not least, a well prepared, certified and ethically responsible construction cost management professional have a key role in the determination of the most accurate and timely representation of construction cost related claims. Based on a wealth of previously accessed literature and my own professional experience, this paper will also show the importance of such professionals in the substantiation of costs in a construction dispute resolved through international arbitration.

In this paper a few themes will be explored that directly and intensely depend and interact with each other been the foundations and key aspects of the very role of construction costs specialists on construction claims that are resolved in international arbitration. In the next sections of this paper we will then explore the following themes:

• Types of construction costs systems and cost types;
• Characteristics of a good construction cost specialist;
• Substantiation of costs in construction claims; and
• Expert witness in international arbitration.

CONSTRUCTION COSTS SYSTEMS AND COST TYPES

It is commonly observed (Gutierrez, F.A.I. et al 2014 and Dieterle, R. and Maziarz, S., 1991) that in the construction sector, the cost of the project – whether it is competitively bid or negotiated – will generally
fall into one of two categories: 1) direct cost; and 2) indirect cost. In the following pages of this article I briefly describe the key construction types to ensure all readers are on the same page in that perspective. Direct costs are those that can be directly associated with the execution of a construction project/contract such as man power, equipment and materials. On the other hand, indirect costs are those that indirectly affect projects such as field overhead which generate benefit to a specific project but cannot be directly allocated to a specific direct cost objective and corporate expenditures as they generate benefit to a number of projects such as the costs associated to a Director who leads the execution of many projects at the same time.

The Standard AACE International Recommended Practice No. 10S-90 COST ENGINEERING TERMINOLOGY TCM Framework: General Reference, Association for the Advancement of Cost Engineering International, 2010, describes these costs as follows:

- Direct costs are directly attributable to the object. In construction, the costs of materials, labor, equipment, etc., and all directly involved efforts or expenses for the cost object are direct costs. In manufacturing or other non-construction industries the portion of operating costs that is directly assignable to a specific product or process is a direct cost. [page 35]

- Indirect costs are not directly attributable to a cost object. Indirect costs are typically allocated to a cost object on some basis. In construction, all costs which are required for completion of the installation, but are not directly attributable to the cost object are indirect, such as overhead. In manufacturing, costs not directly assignable to the end product or process are indirect. These may be costs for management, insurance, taxes, or maintenance, for example. [pag 49]

This section will also detail how the costs data should be assessed/colllected by a construction cost specialist, generally from a contractor’s system, and show that independently of the existing systems in place to manage costs, these consultants need to go through a number of details and different sources of information in order to be able to adequately issue a technical opinion in regards to their reasonableness.

Costing systems relevance

A cost statement from a construction project may be issued from many sources. Generally, a mature, well-structured contractor will have an established system in place that allows for the identification of construction costs in a timely manner such that reports can be issued, representing at any given point in time, the total costs already incurred and accrued in the project to date. Its effectiveness will also depend upon the policies and procedures in place to enable the project to correctly identify, estimate, record, and report costs as well as the level of training and experience of the people involved and operating the system processes. Out of these three key elements (systems, process and people), in this section of the article will only address the costing systems.

Standard cost systems in a “projectized company” will be based upon a code-of-accounts approach to record and accumulate costs for each individual project. Having such a system in place enables the company to allocate costs and estimates to a specific project and line items may these be direct or indirect costs. Direct costs will be coded more easily to a project (e.g. labor can be allocated through the input of time by a time-sheet system) whilst the indirect costs often goes through an allocation calculation which may require more strict science behind the reasoning for it. These systems should be composed of enough details to allow for accurate controlling and monitoring of the construction projects performance including by the issuing of reports for daily, weekly, monthly, quarterly, yearly statements.

When project costs are to be analyzed by the construction costs specialist, one of the first things he/she will need to understand is the project costing system in place. This should encompass mechanisms to identify, purchase, receive and handle materials and equipment as well as register other direct and indirect costs transforming all of that into an integrated, timely cost report.

Construction consultants with the adequate level of experience will know how much materials and man hours, as well as equipment, are needed in a construction project. Knowing well the construction life cycle enables cost consultants to better identify red flags, as for instance, an excess of man hours in the very beginning of projects or instead an excess of engineering hours when the project design has already been concluded months ago.

A last important comment on that matter is the fact that fully integrated ERP systems will more often than not provide companies and projects with a better tool to record and report construction costs than otherwise. Over the years I have seen many companies fool themselves believing that a spreadsheet or a simple controlling system may be sufficient to monitor construction costs adequately. While these may help on a high level basis and some point in time analysis, their very existence increases significantly the risks of incorrect cost recording and reporting therefore directly impacting decision making on construction projects.
Some managers like to think that a well implemented system might be a burden that will only consume hours but human nature and ability to manipulate numbers in a simpler costing system more often than not result in incorrect costs statements.

**Direct Costs**

All costs directly associated with a construction project can be classified as Direct Costs. These would normally include costs such as subcontractors’ costs, labor working directly on the project, materials and supplies, cost of equipment, cost of permits and bonds, etc. Some other costs that can be considered direct costs include items such as tools, fuel, tires, and others that are used directly (and specifically) into a single project. Some forms of insurance can also be considered direct costs if they are purchased on a project-by-project basis. If these were used across a number of projects, such costs would then become indirect costs. The following provides a brief description of the key types of construction costs as well some comments on how to manage these costs.

**Labor**

Workers specifically appointed to a project who are paid a salary will considered a direct cost since these salaries will be directly applied into a project. If for instance an electrical technician has been hired to work on a greenfield oil platform and he works on that project for 24 months, all of his salaries costs will be considered direct costs to that project. This will include any bonuses that they might receive for the conclusion of the specific project even if this is paid, for instance, in the beginning of the next year after the conclusion of the project (such costs should have been accrued for during the execution of the project). Another example would include the costs that a contractor might have when independently hiring a one-time electrician for a specific job at a specific construction project.

It must be mentioned that such costs may dramatically change from jurisdiction to jurisdiction due to a number of reasons. Amongst others, direct labor costs will vary depending on reasons such as:

- the economic situation of the country/region where the project is taking place (hotter economies will generally pay higher salaries);
- the availability of such and such labor (naturally more scarce resources rapidly become more expensive and many times you have to “import” labor from other regions of the country or even of the world);
- the level of risk associated with the conduction of a specific job (for instance working at heights may pay a compensation bonus due to the increased health risk);
- the location where the project is taking place (generally more developed countries pay more reasonable salaries but this can also dramatically change within countries, states, regions, etc.);
- the existing labor benefits and taxes (in some countries like Brazil these may double the salary costs);
- labor relations costs (associated with unions); and
- other labor incentives.

These costs will be recognized as construction costs for a specific project considering their date of occurrence independently of the dates when they are paid for.

**Materials**

Materials costs are very often an important component of the total construction costs and as such must be well controlled. These include the money spent on items that are directly implemented into the construction costs such as concrete, iron, sand, tyres, wiring, etc. The cost of such items should be managed through an all-encompassing mechanism that would allow for the monitoring of quantities ordered, received at site, maintained and directly applied into the project. This should also include a mechanism to allow it to recognize eventual loses which may occur due to a natural materials handling process and/or due to a lack of appropriate skills and/or as a result of quality problem with such materials. These costs will generally be recognized as construction direct costs once applied into the project but for lower cost items, these are often included into the project costs as soon as they are purchased or received at site.

The management of these items can “make or break” the performance of a construction project. In large scale construction projects, the site may be accessed by many different contractors and subcontractors, every single one of them with their own vested interest in delivering their contracted scope of work. There are many projects where the poor management of such costs led the projects to big costs overruns and consequently major claims. For example, a large mining expansion project in South Africa, in which the subcontractors at site would share materials such as wires and tires only for being friendly with their “neighbors”. The lack of adequate
control on that specific project resulted in a massive cost overrun for the owner and in many claims between the owner and some of the contractors.

The proper management of materials costs also passes through the process of acquiring such items. There are items that cannot be purchased and received immediately since this may depend on the local of the construction site, the quantities required, the logistics available, the payment mechanisms, import/export potential issues and many other circumstances. Stukhart, G. and Bell, L.C. (1987) noted from a study of twenty heavy construction sites the following benefits from the introduction of materials management systems:

- 6% reduction in craft labor costs occurred due to the improved availability of materials as needed on site on a specific project;
- on other projects 8% savings were estimated due to reduced delay for materials;
- a comparison of two similar projects with and without a materials management system revealed a change in productivity from 1.92 to 1.14 man-hours per unit mostly due to the timely availability of materials;
- warehouse costs were found to decrease 50%; and
- interest charges for inventory declined, with one project reporting relevant cash flow savings.

The above study shows that an effective materials management system can also be useful to a contractor for consideration on future project bids. In essence, a contractor can gain a competitive advantage over other bidders that don’t employ an effective materials management system.

**Equipment**

Equipment direct costs will include the costs associated with the acquisition or renting and utilization of specific equipment during the execution of the construction project. These might include the costs of items such as excavation and loading equipment, compacting and grading equipment, drilling and blasting equipment, lifting and erecting equipment, mixing and paving equipment, construction tools and other equipment.

Other factors such as the availability of space within the construction site will also need to be considered since these equipment many times are immense and their operation might need lots of space. All of these items will not only directly impact the direct project costs but it will also impact job-site productivity of a construction site.

The costs of equipment should also consider the productivity of the equipment themselves as this may increase or decrease the costs associated with its operation including their renting costs, operation staff, maintenance, and others. Hendrickson, C. (1998) noted the following interesting example:

In the mid-1980’s, some Japanese firms were successful in obtaining construction contracts for tunneling in the United States by using new equipment and methods. For example, the Japanese firm of Ohbayashi won the sewer contract in San Francisco because of its advanced tunneling technology. When a tunnel is dug through soft earth, as in San Francisco, it must be maintained at a few atmospheres of pressure to keep it from caving in. Workers must spend several hours in a pressure chamber before entering the tunnel and several more in decompression afterwards. They can stay inside for only three or four hours, always at considerable risk from cave-ins and asphyxiation. Ohbayashi used the new Japanese “earth-pressure-balance” method, which eliminates these problems. Whirling blades advance slowly, cutting the tunnel. The loose earth temporarily remains behind to balance the pressure of the compact earth on all sides. Meanwhile, prefabricated concrete segments are inserted and joined with waterproof seals to line the tunnel. Then the loose earth is conveyed away. This new tunneling method enabled Ohbayashi to bid $5 million below the engineer’s estimate for a San Francisco sewer. The firm completed the tunnel three months ahead of schedule. In effect, an innovation involving new technology and method led to considerable cost and time savings.

Equipment costs must also account for such items as fuel, maintenance, etc.

**General Conditions Costs**

General conditions are the costs incurred directly for a project that cannot be assigned to a final cost objective (direct cost code). These include such items as:

- Project Management & Supervision
- Jobsite Trailers
- Portable Toilets
- Etc.
Many of these costs are time related in nature and are thus the length of the project schedule will influence the budgeting and actual cost of general conditions expenses.

**Indirect Costs – Home Office Overhead**

Costs that cannot be directly allocated to a specific construction project will be considered indirect costs. These include the home office overhead costs associated with the corporate function or simply the costs of professionals, equipment and other elements for which the benefits of their utilization can be distributed to many functions and projects within the organization. This may not be misunderstood as there are costs that will be considered direct costs even when it is applied to more than one project. For instance, a specific welder working on 2 projects on a shipyard half of this time on an FPSO and the other half in a oil platform, will have his labor cost split into these two construction projects (perhaps through a time-sheet system) and this shared cost will be direct labor cost to both projects following the proportion of time that he/she would have spent in each project.

Indirect costs can also include the general liability insurances of vehicles, motor vehicle repairs, depreciation of corporate assets, some communication expenses, and others. Some professionals understand labor related costs such as employee paid vacation time, holidays, sick days, drivers, warehouse personnel, training, safety and clothing as indirect costs but it is more often observed that these are considered direct costs. The basic principle that one needs to follow is that if the cost can be directly associated to the generation of value to a specific project, then it should be considered a direct cost, otherwise, indirect cost.

The following are some of the most common indirect/home office cost categories found in construction projects.

**Office Staff Costs/ Administration costs**

Professionals engaged to supervise and direct the contract as well as personnel responsible for other administration functions such as finance, payroll, public relations, etc. will be considered indirect costs when they are not paid per project and have a broader function rather than only focused on a specific construction project. These costs will include the wages, benefits and payroll taxes of the office staff. For a more comprehensive list of additional home office costs see Dieterle, R. (1985).

**Taxes**

Taxes will vary widely from a jurisdiction to another so been aware of them and managing these well can make a massive difference to a construction project performance. Many consultants in the market can help companies and projects in an appropriate tax planning in order to make the most of it without breaching any applicable compliance rules, Laws or regulations. These are considered indirect costs to a construction project.

**Financing costs**

Financing costs can also be considered a direct cost, for instance if a specific credit line has been acquired for the cash flow management of a specific project, however, it is more common to find this responsibility falling under a central Finance team, in which case, such costs would be considered indirect costs to the project. This is generally the case since corporations will generally have a better financial position than one specific project which in turn, results in better rates and conditions for the borrower.

**Maintenance**

When maintenance cannot be allocated to a specific construction project since it receives damages over time from a variety of projects, it can be considered indirect cost. However, it must be pointed out that even when been used a variety of projects, specific damages caused to equipment during a project can be considered a direct cost. In addition to maintaining equipment, equipment also accrues costs as they depreciate in value.

**SUBSTANTIATION OF COSTS IN CONSTRUCTION CLAIMS**

The previous section of this article listed the most common types of costs in a construction project and how these should be classified, recorded and reported. The intention was to ensure that we can now move into how these costs must be substantiated when it is part of a construction claim independently of the type of contract in dispute (e.g. EPC, EPCM, etc.), the issuer or receiver of the claim (e.g. owner or contractor), the environment in which this will be discussed (e.g. negotiation, mediation, arbitration), the amounts involved and other factors.

In order to recover in a construction claim, the claimant, generally the contractor, must be able to provide
enough information that proves both the entitlement and quantum aspects of their claim. The first element, entitlement, will only take place when the claimant is able to prove that his theory of recovery makes sense and is in compliance with the agreed contract (e.g. different site conditions from preliminary information provided at the time of the bid or suspension of work requested by the owner). Generally only when entitlement has been accepted by the other party is when the claimant needs to present supporting information and documentation proving the amount he is entitled to recover.

In my experience in different countries involving mostly Anglo Saxon and Latin business and construction cultures, it is common that many contractors (perhaps most of them), put a lot of effort to prove that they are entitled to their claims, however, many of them neglect the fact that an accurate, organized and well supported quantum presentation will be as important as the previous matter. As will be briefly discussed in this paper, there is a large variety of methods and techniques to prove quantum therefore the claimant must make several critical choices when a claim is about to be presented.

**Principles behind a well presented construction cost claims**

There are a few principles that must be followed when one party that feels jeopardized presents a construction cost claim to the other party. It is of great importance that the text presented makes logic sense and that each claim is self-sufficient, that meaning that each claim will need to make sense on its own and that any reader, not necessarily involved in the construction project, will have to understand what is been disputed and what exactly is been requested by the claimant party. In this section four of those principles are as follows:

**Verifiable**

When a cost claim is presented to another party, it is imperative that the reasoning behind the claim makes sense and that any third party reading the presentation of the claim would be able to understand it easily as well as be able to re-perform the calculations and analysis reaching the same conclusions. In order to provide the analysis with the adequate level of trustworthiness, it must be verifiable by an independent third party.

It is very commonly found in construction contracts, one or more clauses talking about the “verification” or audit rights of the parties over the project records including costs records. The verification can, many times, occur through an independent third party review but can also be performed by the owner’s team it all depending on who is going to read the report and how it is intended to be used. It is important that the information provided by the “audited” party (generally the contractor) can be easily available, organized and understandable. When this is not the case, there is an immediate impression from the “auditor” side (generally the owner) that the records may be incorrect and a more detailed review might be requested and/or performed as a follow on of the first visit. On the other hand, when information is readily and easily available, it can be verifiable on a more straight forward manner and thus, provides the owner with a better impression about the adequacy of the numbers presented. Whilst this physiological factor should not be a determination factor, more often than not it makes a big difference for all parties involved in the conduction of the verification / audit process which might be a long and complex process.

**Peer Review**

Following the same rational as mentioned above, any claim presentation will obtain a greater level of reliability and thus will be a stronger statement when the presenter is able to prove that the calculations, the reasoning and the final results have been reviewed by someone independent to the process. In that sense, a peer review many times helps the reader to believe more on the claim statement as this would have been reviewed and agreed by another professional or firm with their own beliefs and professional duties. Whilst a peer review alone will generally not be sufficient to persuade the claim respondent by any means, it will definitely make the statements more reliable.

In addition, it must be mentioned that the very process of going through a peer review many times brings to light viewpoints not necessarily observed at first and the possibility of discussing this with a peer professional in an open and honest manner before the results are presented to the respondent, will surely provide for an opportunity of correcting and adjusting points of view, analysis and eventually conclusions. I have spent a good part of my career working for one of the big 4 accounting and consulting firms and have seen over the years how important it can be a peer review in the process of refining and challenging analysis before they are presented to third parties. A good part of the quality assured on presentation of results to clients and to the market comes exactly from the possibility of different interpretations of any given statement to be explored
**Credibility**

It is very common in a cost claim analysis and presentation to compare industry ratios and performance indicators to the project’s performance ratios and indicators. Such comparisons are made as examples of how much specific equipment, labor, materials or services may cost. It is also common to find researches and surveys results been mentioned within the presentation of claims with the intention of helping in the claim receiver/reader to be convinced of the claims themselves. While this might indeed be of great assistance, it is very important to note that the credibility of the information used as a basis for that will be as important as the very information presented. The risk that the information used as a reference in such processes may not be credible should be very carefully assessed before this is even included in the claim presentation. This is so because if the credibility of any information used on a claim presentation is jeopardized, the entire presentation might lose strength and become a target of all types of negative comments and disbelief.

There are many institutes and associations that periodically issue industry ratios and facts. In order to critically analyze the information before they are used, the claim presenter has to consider the credibility of the issuer of the information as well as the results presented. If the source of the information is not an independent body and does not have the appropriate “label” for issuing such information (e.g. a hospital issuing information about observed airport construction conditions), the use of the information will be put in check and may well result more negatively than otherwise.

**Recognized parameters**

As well as the other items listed above, the use of techniques, rules, standards and parameters that have already been accepted by the larger scientific community will also make the reader of the claim feel more comfortable about the presentation and reasoning behind the requests. There are many internationally recognized industry parameters utilized in the construction of project budgets and estimates. Their utilization in the presentation of a construction claim can make the negotiation over the requested amounts occur on a much easier, simpler and straightforward manner.

Most commonly used methods for presenting construction cost claims

While there a number of methods for pricing a construction claim, one considered the most accurate method is the demonstration of the actual cost of performing the work. This can be made through the use of cost accounts established by the contractor for the project work. In some circumstances the actual costs may not be available and in those cases, the contractor must estimate the costs.

**Total Cost**

A commonly used method of estimating is the “total cost” approach which is obtained by calculating the difference between the original estimate (the baseline) and the cost actually incurred for the project. Under this method, damages are calculated by subtracting the contract amount (most updated version including eventual approved variation orders) from the actual total cost of performance of the works. Silverberg, K. (2003) concluded on his article that “the total cost method is a way of solving the problem of proving damages to a reasonable certainty, a problem to which the construction industry is particularly susceptible”.

The following picture demonstrates graphically how the total cost claim is to be calculated.

**Illustration 1** Basic formula for total cost claim calculation.

![Formula for total cost claim calculation](image)

**Modified Total Cost**

When there is no need or it is not practical to document actual costs, a modified total cost methodology can be applied. Generally the method will only be used after the court (judicial or arbitral) has already determined that the requesting party has a prima facie case on the merit which takes place when the following 4 conditions apply: (1) the requesting party cannot practically prove the real losses; (2) there was not an under estimate at bid proposal; (3) actual costs were realistic; and (4) it can be determined that responsibility over the additional costs is not from the requesting party. Illustration 2 below graphically represents that when the costs presented by one of the parties were not realistic or responsibility over the extra costs could not be clearly with one of the parties, then these costs are to be identified, quantified
and subtracted from the cost when calculating the modified total cost.

**Illustration 2** Basic formula for total adjusted cost claim calculation.

**Industry surveys and studies**

It is very commonly accepted in the assessment and negotiation of claims that industry surveys and studies are used as the basis for claiming additional costs in a specific construction event. If for instance the cost of a specific type of labor (e.g. welders) increased dramatically during the construction project and this is an escalation that could not be previewed by the parties and that was not specifically protected under the signed contracts, than an industry survey could be very well placed to persuade the involved parties about the need to recover such costs. While this will generally not be enough support if placed alone, it can well be a very good additional supporting piece of information on that sense.

Some important comments also need to be presented in regards to such surveys and studies have to do with Credibility and Reasonableness:

- **Credibility**: I have made similar comments on this paper before but the credibility of the information provided will be as important as the information itself. If a large claim is in place and one believes that an industry survey and/or study will help persuading the other party that it makes sense, then it must be a survey/study that comes from a reliable source. These would generally come from the largest and oldest industry institutes and organizations and if a new study is been launched, one should also think about improving the document’s conclusions credibility by obtaining a third independent party stamp on it. Different countries, regions and markets will have different issuers of the surveys, studies and of the “stamps” themselves and that is when the knowledge of the local culture and business protocols are sometimes even more relevant than the information itself.

- **Reasonableness**: Sometimes a lot of what is expected from the information been presented is common sense and as surprising as it may appear, it is many times not the case. When information is been presented as the basis or support to a construction claim it is very important that the claimant assess how reasonable it is. When industry surveys and studies are used as part of the supporting documentation to a claim, one need to assess if it makes sense using that piece of information for the specific claim under review. The reviewer, and eventually an arbitrator and a judge will naturally assess this perspective and if a positive answer is not possible to be obtained from that assessment, the entire effort in confirming the claim might even have a negative effect towards settlement or agreement.

**Measured Mile**

The Measured Mile is a commonly accepted method for determining loss of productivity on a construction project and this can be the basis for the claim of additional cost on a construction project. On that method, one compares the cost of “impacted” work against the cost incurred in performing similar work which will be called “unimpacted” work. This comparison needs to be based on productivity calculations for the same project and this generally makes it a more acceptable and credible approach to supporting the claim. As I describe it on the following paragraphs, calculating it and demonstrating is a far easier process when the parties (generally the contractor) keeps adequate level, detail and accuracy of productivity information by location, type of work and crews.

High level 5 steps for calculating and demonstrating the measured-mile:

1. Impacted work must be identified and defined and this includes the unit of measurement for the work under study. For example, certain types of transport previewed by the owner as suitable for use in the transportation of materials (let’s say pipeline) may not be suitable if the plan of construction considers prefabricating large pieces spools. Under this example one could consider impacted work when spools were transported and unimpacted when pipelines were transported.
2. The time period and project location where the works took place also need to be identified for the analysis of the impacted and unimpacted works. Naturally there would be massive differences of productivity between project works taking place in the city or in the mountains and a similar consideration can take place in regards to the time of the year when the projects take place as in some periods there is rain, snow, too dry or too hot periods of time and these facts make a difference in construction productivity. The unimpacted period will be when there are not factors disturbing productivity and this will considered the measured-mile for reference purposes. In the example mentioned before, different production factors would be achieved depending on the time of the project and also if different transport options were considered or observed.

3. After impacted and unimpacted periods have been studied and identified, there has to be a thoughtful assessment of the difference between the two periods and a representative unimpacted period has to be chosen as the basis for comparison. The selection of the measured-mile needs to be very precise since the party receiving the claim may put at check the analysis and the claim itself if the unimpacted period is not a good representation of what happened during the project. This method takes as a starting point the fact that all work on the project could have been performed at the same rate of productivity as the one chosen as the unimpacted period. On our example, if you chose a period of time where transportation was been made by helicopter and compare it to the periods where the transport was through road, then it is very likely that the method will not be accepted and thus will not be the claim.

4. All relevant documentation from the project that represents the recorded facts from the works of the project needs to be located and put together in an organized manner. This would include job-cost records identifying man-hours, equipment and material used. This information will be absolutely crucial to the calculation and support of the lost productivity and all records for the unimpacted work periods will need to be carefully assessed. It is also relevant to be able to demonstrate that project records were kept the same fashion for both impacted and unimpacted period.

5. The basis of the analysis (currency or hours, for instance) will need to be determined and then used as on the development of an unimpacted benchmark productivity measurement. The approach will be based on the total crew hours or cost to complete (including labor costs, equipment rental, operating costs and consumables that vary with time) a work task. When the productivity factors and costs have been developed these will need to be applied to the impacted work quantities.

This method of analysis will generally be adequate when it compares similar work to the impacted work. Quantity, skill level and effort of labor used in the comparisons of the impacted and unimpacted work activities should be similar.

On that matter, a well structure and robust analysis will also identify and assess other likely causes for the claimed impact as this will probably be indicated as the real causes for the loss of productivity. The claimant will need to be able to explain why these likely causes do not apply. This might be a very difficult and complex task as very commonly the events taking place in a construction project can be seen from different perspectives and claims will generally not be easily accepted by the other party.

**Cause & Effect**

A last type of method often utilized and widely accepted for demonstrating a cost claim in a construction cost is called Cause & Effect method. Under this easy to follow concept, the claimant needs to clearly identify the root causes for each claim and explain how the identified causes actually resulted in the effects under study. This generally makes life easy for both sides but to really be a straightforward process it needs to be based on common sense assumptions and conclusions. See below a few examples of when and how this could be utilized:

- Rains outside the climatic window were much heavier and longer than normally expected (and recorded annually) therefore work stoppages were longer than planned;
- Steel production declined severely increasing costs over and above the cost escalation assumptions recognized under the contract; and
• Cost of fuel dramatically increased during the execution of the transportation task therefore cost of transport was much higher than considered on the budget.

Obviously this rational alone will not prove that the claimant nor the other party is correct on their reasoning, however, combined with other types of proofs, documentation, rational, the cause & effect method helps readers understand better the claim therefore it is a strong tool towards the achievement of an agreement between the parties.

Construction cost claims determination and assessment

Methodologies to assessing and analyzing construction and contract claims and their associated issues can be very generic in nature but should be carefully chosen based on a number of factors such as what is really been claimed for, the cultural background of the involved parties, the modality and contract signed of, the applicable Law and standards and, naturally, the facts that took place. The approach to be applied will always need to be tailored to meet the specific needs and circumstances observed on a case by case basis.

A well structures approach to claims resolution is founded on a broad-based, multidisciplinary team approach, since construction claims themselves usually involve a wide variety of subject matter expertise regarding subjects only understood by qualified engineers, construction specialists, project management specialists, legal and accounting practitioners. Therefore a multi-disciplined staff of engineers, construction and contract managers, cost specialists and scheduling experts is often required to provide the range of expertise needed in the overall analysis of such claims. The combination of knowledge contained within these disciplines is essential to a proper understanding the often complex interrelationships among the liability factors, causation and damages of a claim.

Generally the most appropriate way to establish a direct and objective evaluation of the merits of the claim draws upon the knowledge, experience and different perspectives of a variety of experienced professionals. It is very important to be able to demonstrate a realistic and comprehensive analysis and assessment of the claims which can be formalized thought a number of documents and proofs including: expert reports; calculation of damages including impact costs; preparation and analysis of CPM schedules and EOT assessments; expert witness testimony; assistance in preparing or answering interrogatories; participation in discovery procedures; preparation of visual exhibits; assistance in strategy discussions and settlement negotiations; and technical expertise during the dispute resolution process.

When they are well prepared and supported, construction claims specialists can greatly reduce the risk and expense involved in major construction disputes. It is observed that many times a well prepared expert report can provide the basis for making sound decisions and although not extremely recurrent, their expert reports can motivate settlement between the parties since facts are well organized, supported and presented in a convincing fashion. I have recently experienced such a case where in the construction of a transmission line the contractor claimed an enormous USD amount.

Liability Determination

A variety of project documentation and information will need to be assessed by the expert when he/she investigates liability, causation and responsibility issues. This will generally include obtaining, organizing and assessing factual data which can be greatly eased by the use of appropriately selected document control system. The market offers a number of options of computerized document control systems however its selection needs to take into account the possibility of tailoring it to suit the economic and technical needs of the parties. Project documentation that will be relevant may include, but is not limited to: project correspondence (such as letters, notifications, meeting, emails, etc.); daily, weekly and monthly reports; contract drawings and specifications; meeting minutes; contracts and subcontracts; and other available records. The review of data and information contained in such records in addition to the construction expert’s knowledge of industry practice and experience allows him/her in the determination of the contracted obligations as well as the performance expected from the involved parties.

Comparing factual records with required performance under the circumstances listed above allows the expert to clearly identify and to assess liability. A wide variety of legal/contractual issues can be observed in the presentation of a claim, nonetheless, I illustrate below some technical approaches to the entitlement (merit) analysis of claims noting some common issues used by contractors to seek recovery.
Changes to Direct Cost Claims

Changes in construction represent a large percentage of the issues falling under a changes clause when there is disagreements on whether these have occurred due to directive received from the owner or not and whether these represent or nor work over and beyond the minimum requirements of the contract. The number of instances where such situation can be observed is very large and the legal correspondent issues are also multiple. Amongst others, see below a few examples of such instances:

• when it is difficult to give a reasonable meaning to all the words used throughout the contract;

• discussions taking place even before the date of the dispute;

• when matters related to order of precedence are discussed;

• knowledge of one party of the other party’s interpretation; and

• reliance by the contractor during the bidding phase on the declared interpretation.

It is common that prior the bidding phase the bidders can make enquires and ask for clarification in regards to the disclosed specifications. Also, it is very common to observe obvious omission or significant discrepancy between what the owner really wants / needs against the actual specifications. When the bidder does not inquire about omissions or discrepancies before they submit their proposals this may result in the claim being barred at a later stage when it takes place.

At last but not least it is important to always remember that the rule of contract proferentem may apply. This rule establishes that under certain circumstances the reasonable interpretation of the non-drafter may prevail. This may be of great help to one of the sides of the claim but naturally will not help both parties.

The above mentioned issues and others as they appear during the consideration of construction claims (and potential claims) need to be considered in detail when one makes an assessment of the maters in dispute in a construction project. In addition, when one thinks about all of the categories of constructive claims, there are also detailed legal and contractual sub-issues that need to be taken into account for the appropriate determination of the existence of merit as claimed.

Acceleration Claims

This type of claim is more often observed as more sophisticated scheduling tools are utilized in the monitoring and management of construction projects. This is also a result of the market recognizing the fact that there is a cost that needs to be remunerated when a contractor compresses the performance of the works to achieve specific agreed (many times tight) schedule activities that lie within the critical paths of the construction projects.

Having said that, it is clear to understand why a complete construction cost specialist must be able to interpret (at least) the assessments made by a delay/EOT specialist and measure the impacts of these time variations in the cost of the project. Part of assessing delays includes the creation, assessment and analysis of CPM schedules, progress reports, relevant correspondence, and labor and equipment productivity rates and from there, determine if a contractor actually accelerated or not its performance of works during the construction project. With that in hands such consultants can evaluate the legal and contractual responsibilities of the parties in the event of an acceleration of the work and determine accurately the cost of the acceleration.

When entitlement for acceleration is sought after, the contractor needs to be able to prove that the following 5 conditions apply:

• contractor experienced excusable delay and is entitled to a time extension as per the contract;

• contractor notified the owner about the delay and has specifically requested the time extension;

• time extension was not granted by the owner;

• the owner ordered the contractor to accelerate making it clear to the contractor that it is required to complete the work by the original contract completion date; and

• the contractor actually accelerates the works, incurring therefore increased costs of performance.

Acceleration claims can be either based on acceleration directed by the owner or on constructive acceleration theory. In both circumstances, the construction claim consultant must prepare a detailed factual analysis to validate or defend against the assertions presented by the other party in regards to the job being ahead or behind a properly adjusted schedule at the time of acceleration. When the acceleration claim is been prepared based upon a total-cost approach, it will be essential that excess costs that are not due to any
effort of acceleration are identified and segregated as these may be the contractor’s responsibility only. These excess costs could include inadequate provision on the contractor’s bid of labor, material, and/or equipment costs but also the costs of acceleration incurred by the contractor to overcome their own delays or on its own efforts to maintain the planned schedule. Such cases would be considered not excusable delays; increased material costs; or subcontractor costs; or the cost of rework.

The position of the company in regards to liability for acceleration should be based on the results of a comprehensive cost and productivity analyses in conjunction with a detailed review of the involved facts (consideration should be given to facts on and off the critical path). Also, the detailed assessment of schedule activities (presenting delays or not) as well as the cumulative effects of acceleration on or off the critical path can and should be presented graphically to help the readers of the information in understanding the impacts of acceleration. This will generally help the claimant to make their point in the negotiation arena but also during a more formal dispute.

**Other Claims**

As this was not the intent of this article to describe different methods for assessing construction claims I will write more about them in a separate exercise. However, it must be mentioned that in addition to the examples mentioned above other very common claims types include “Disruption Claims” which results from various changes caused by the owner and “Delay Claims for Indirect Costs” which consider the request for the reimbursement of indirect costs incurred by the contractor due to extension of time caused by excusable delays which are also compensable.

**CHARACTERISTICS OF A GOOD CONSTRUCTION COST SPECIALIST**

Construction costs specialist can develop their careers and professional recognition through a number of manners. Some paths can be more formal from an academics perspective and include earning higher level university degrees such as Bachelor of Science, Master of Science, PhD and other degrees. Others will have developed their careers through the years of intensive dedication to the matters assessed. Reality is that a combination of these factors will always help a good construction cost specialist to be prepared for the conduction of a professional and respectable construction claim exercise.

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**Formal qualifications**

Obtaining formal qualification in the fields related to construction claims is most definitely one of the most efficient ways of proving for oneself, other practitioners and the market that the professional is preparing himself to face the challenges observed on a daily basis by construction claims professionals. There is a number of qualifications that can help better a professional in that perspective and the quantity surveyor is one of the key ones. It must be said though, that construction claims involve matters that generally will be better dealt with by a multidisciplinary team or dual (or more) qualified professionals. Themes and formal qualifications that will be of help on that matter include, but are not limited to the following:

- Engineering (more often civil, mechanical or electrical);
- Law; and
- Business administration, cost engineering, economics and accounting.

These are generally obtained in the beginning of their careers through the successful completion of a bachelor degree of a recognized university level institution. However, many professionals find their ways as their careers develop and is not uncommon to find professionals already in the market for many years coming back the schools to obtain additional formal qualifications on matters that they were not necessarily qualified on but have been experience on.

More recently we have seen with an increased frequency professionals on that field that go after even more specialized and specific certifications. These are commonly found in matters that relate to project management, risk management, construction management, schedule management, and so on. As these are generally issued by subject matter institutes that have their own high level of ethics and qualification standards, they are also good ways to ensure that professionals are kept up to date with the most recent information and the specific matters.

An additional kind of formal qualification includes the post-graduation degrees in which professionals have an opportunity to specialize in specific matters. Again, the areas of expertise that would make sense for a construction cost specialist which include matters that relate to engineering, contract and project management, economics, business administration, Law and accounting.
**Professional Experience**

A seasoned construction cost specialist will have had enough exposure to construction related situations so that he/she will more easily and readily understand what really takes place during a construction project. This is important as many times certain situations in a construction project certain require that urgent actions are taken and this will need to be taken into consideration when assessing a claim as these generally impact the cost and schedule of the project.

In addition, this experience will also better enable the professional not only to read and understand all construction related documents but also to better communicate with professionals within the owner’s and contractor’s teams. This results in easier access to information and obviously better and more accurate interpretation of the facts that took place during the construction project as well as its impacts on the construction cost and schedule.

**Personal Characteristics**

A good construction cost specialist will have a wide range of professional skills that, when integrated into a single professional, makes him/her to quickly differentiate himself in the market place. As I mentioned before construction cost claims generally involve a number of different subject matters and therefore someone who deals with this on a daily basis will be better prepared to work on that field when they present a number of skills which include the following:

- **Strategic:** having the ability to understand the big picture of what happened during the construction project but also during the negotiation/dispute scene is important for the consultant to better understand and read the information provided to them during the execution of his assessments;

- **Analytical:** as mentioned throughout this article construction claims produce an immense amount of information and been able to analytically look at these and select what needs to be further assessed or not will help the consultant to save time and be more accurate on their conclusions;

- **Sceptical:** as everything in life, construction related information has always different ways to be seen, interpreted and understood. Been sceptical will help a construction cost specialist to ensure that his/her views are strongly supported by his/her owns conclusions and beliefs;

- **Knowledgeable:** understanding the matters been assessed profoundly will help the consultant to ensure he/she does not get distracted by technical matters that are not relevant to the specific assessment been performed. It will also help them to be able to focus on what really deserves attention.

- **Tactful/Political:** been able to listen and understand that different parties have different reasons, viewpoints and interests on matters been assessed will definitely help construction cost specialists to obtain easier the right level of information in the different levels and “rooms” of a construction project. Many times there is a lack of integrity between the information provided by high and low level professionals within a construction project and been able to well circulate within the different levels of such a project will make it easier for that professional to make an entire and clear picture of what really happened during the construction project.

- **Patient:** many times construction claims are dealt with during the execution of the project therefore many other matters may be in the focus of the involved professionals. Been patient will help the consultant to understand and take into account the different focus and priorities that the interviewed teams may have during the execution of their work.

- **Respectful:** on the same manner that been patient helps the consultant to be a good on his/her job, been respectful will allow him/her to have better chances to move up on the list of priorities of the teams been interviewed during the process of assessing and/or putting together a claim.

**EXPERT WITNESSING IN INTERNATIONAL ARBITRATION**

Construction cost specialist as an Expert Witness

A well prepared construction cost management professional will always have a key role in the determination of the most accurate and timely representation of construction cost related claims. The importance of such professionals in the substantiation of costs in a construction dispute resolved through international arbitration can be determined by very same fact that arbitrators generally do not know in detail how a construction project happens, are not necessarily familiarized with construction contracts and have not experienced closely how these are managed on a day-to-day basis.
Considering the above mentioned, in a situation where a construction cost dispute is been resolved through an international arbitration (considering this is one that follows world class practices and procedures), or even in cases when such dispute goes to the Court, many times an expert report will need to be written and this will be prepared by an Expert Witness. It was observed (Davie v Magistrates of Edinburgh 1953 S.C 34.) that the Expert Witness’ role is “to furnish the court with scientific, technical or other specialist information which is likely to be outside the knowledge or experience of the tribunal.”

Considering the fact that many times the only person who will thoroughly understand the costs, what it encompasses, what they really mean, where they came from and how they were tracked, recorded and put together into financial statements, is the construction cost specialist, it will also be of major relevance finding the right professional when it comes to hiring an Expert Witness. This professional will have to be able to understand about construction costs but will also need to have certain skills that are not easily found. We will discuss in further detail in the continuation of this article.

What is generally expected from an Expert Witness in the conduction of their role in an international arbitration?

Experts around the world from time to time issue their views on how an Expert Witness should conduct their role and some arbitration jurisdictions have this better defined than others. Below we briefly describe some of the items that need to be taken into consideration by everyone involved in an arbitration case. Whilst this might seem a natural starting point for anyone who wants to be acting on that space, the items below may be of use especially for those who are not necessarily acting as the Expert Witness already. This is especially relevant given the fact that expectations from different parties not only might, but are many times, quite diverse on the different sides of the discussion table (and sometimes even at the same side).

**Independence**

While acting as an Expert Witness, evidences must be produced and presented from an independent point of view. Very technical matters may be of easier distinction but some matters are not and this is when the independence factor comes to play with an even stronger role. When an Expert Witness diligently prepares their analysis of facts, documents and perspectives of what really happened during a construction project, they must always remember that his role will only be fulfilled when and if they are truly unbiased.

Impartiality in such instances will also play an important role on the Expert Witness credibility and long term career. An Expert Witness that is known to change his/her mind based on the previous, current or future relationships will very quickly be marked as non-reliable Expert and therefore will rapidly stay out of the market for that reason.

Not less relevant, it is fair to mention that independence in the conduction of such relevant work is of paramount importance for the resolution process itself. Considering that both parties are truly going through an arbitration process because they cannot agree on some matters that they really believe to be right about, the entire institution of the arbitration process would be jeopardized if the Expert Witness was not independent. He/she provides for the discussion arena an expertise that no one else could and in the construction scenario, this is the case more often than not. Therefore, not defending a specific view but been able to autonomously defend their own views and beliefs on the facts is fundamental in the conduction of their very own duty.

**Unbiased and within expertise opinion**

The expert’s opinion should always be unbiased and it is always important as well that it is related to matters within his/her areas of expertise. Whilst this might seem very logic, it is observed from time to time Expert Witness that have been chosen due to other factors which alone, are not good enough, such as been from some party’s trust or been known for been good arguer.

As important as the previously mentioned point is that when a matter been examined falls outside his/her areas of expertise, he/she should be comfortable to state that this is the case. This is not only a matter of been fair and honest with the process but this will also set up expectations from all parties involved at the right level avoiding misperceptions and even detraction of the opinions presented as a whole.

**Clear identification of assumptions**

An Expert Witness should always clearly state the facts and the assumptions taken into account as the basis for the creation of his/her opinion. Perhaps as important as that is the fact that they should also take into account all other facts and potential assumptions that could be used by the other party that could diminish his/her own statements and opinion’s strength.
The Expert Witness should also feel at ease to inform the parties when the amount and/or the quality of the information available are not enough for his/her determination and statement of opinion. It would be prejudicial for the entire process if questions were raised about how such and such opinion were put together and during the process it was found that basic information that was not available was simply taken as assumptions without these been disclosed as such.

Changing opinions is allowed

The Expert Witness should always feel very comfortable to change his/her technical opinion when a different viewpoint was consistently presented to them. This might well happen during the exchange of reports and additional information since not always a specific party has all the information available that the other party has (or perhaps not in the same elaborated format). When such a situation takes place, i.e. the Expert Witness changed his/her mind about any given topic, this should be communicated to the other party and the court/arbitrators.

REFERENCES


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Felipe André Gutiérrez is Senior Vice President in charge of Hill’s Construction Claims Group operations in Latin America. Mr. Gutiérrez is based out of Hill’s office in São Paulo, Brazil. Mr. Gutiérrez has more than 15 years of experience providing risk and management consulting services and has extensive experience in the delivery of construction risk management and claims advisory, arbitration related services (including expert reports), internal audit, corporate governance, enterprise risk management, compliance and assurance services in Brazil, Latin America, South Africa and Australia. His market sector experience includes buildings, power, oil and gas, mining and infrastructure projects.