

Application of Cost Engineering Techniques During the Global Recession



Gamini Dayaratne MACostE, AACE

is holding memberships with The Association of Cost Engineers, U.K. and AACEI, U.S.A. He has been employed by British International Construction companies for the past 18 years in Sultanate of Oman and U.A.E. Presently working as a Assistant Commercial Manager, Al Futtaim Carillion LLC, Dubai

Summary

It is now confirmed that the world economy is in recession since late 2008. It has affected businesses and organizations in varying degrees and proportions depending on their exposure to the global financial system. In this Technical Paper, an attempt has been made to understand the effects of global economic crisis on the parties involved in the construction industry, (i.e. The Client, Project Manager and other Consultants, Contractor and Suppliers) and find ways and means in minimizing the effects in relation to Cost Engineering principles.

The major conclusions and recommendations of the paper relate to the effective use of Cost Engineering Techniques in minimising the effects of the global economic crisis by these parties. These include:

- The effective use of Engineering Economics and Cost-Benefit Analysis by Clients
- How Earned Value Management could help Project Managers to accurately advise their Clients on their projects
- What costs may not be recoverable by Contractors? What remedies they may have in the wake of project cancellations?
- How the Suppliers could protect themselves from the sudden price fluctuations in the market – theories of Risk Management, Hedging and Insurance
- Silver lining in the dark clouds – Positives suggested during the period of recession

What is the role of a Cost Engineer?

The Cost Engineer's role in a project could be compared with that of a navigator of a ship. He does not really control the actual progress of the ship, but, he is constantly evaluating its status, comparing with the plan,

helping the skipper stay on course. In order to accomplish this 'navigation', the Cost Engineer must know exactly what the scope of the job is, what the conditions are, the present status of the job and how to forecast the future. If, based on the present, the future is not assuring, the Cost Engineer must inform the Project Manager so that corrective action can be taken immediately. Cost control will make sure that the ship will stay on course; cost forecasting tells what will happen if the ship continues its present course. That is why timely corrective action is required if the trend is not as planned. Otherwise, the ship will follow the dominant currents and winds, and may land hundreds of miles away from its destination and many days behind – if it does not crash on some rocks on the way¹.

Introduction to the global economic crisis in 2008

In 2008, a global economic crisis was suggested by several important indicators of economic downturn worldwide. These included high oil prices, which led to both high food prices and global inflation; a substantial credit crisis leading to the bankruptcy of large and well established investment banks as well as commercial banks in various nations around the world. This in turn contributed to increased unemployment and the possibility of global recession².

The rise and fall of the oil prices during 2008 also is largely seen as consequential to the same phenomenon. Oil prices, which were zooming to all-time highs have crashed. Oil prices had crossed the \$100-mark for the first time in 2008. The prices further zoomed to \$147 in July. There were even predictions that oil would hit the \$200 mark. The surge in oil prices was alarming. The fall in the dollar rates was one of reasons for the rise in oil prices. A weaker American currency tends to increase the

demand for dollar-denominated oil as it becomes cheaper for buyers using stronger currencies. Oil prices also rose as investors saw it as a safe investment amid fears of rising inflation and a US recession.

However, demand for oil started slowing down drastically in the wake of the recession in developing countries. The downside of oil prices began³. (See Chart No.1)

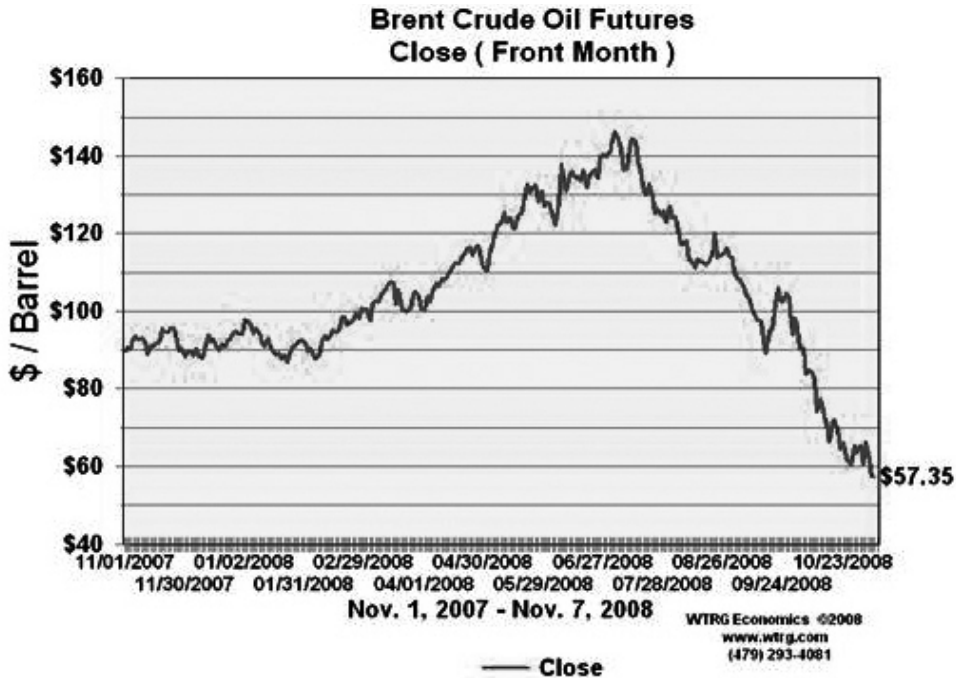


Chart No. 1 – The rise and fall of crude oil prices in 2008

How it affects the construction industry

a) Client

The term ‘Client’ in this report refers to the individual or company who owns or invests in the project. In today’s world of business organizations, most clients depend on global financial institutions for financing their projects. Since late 2008, in the wake of the global financial crisis, banks in most countries have adopted credit control measures creating a huge impact on the availability of funds for the new projects. With the increasingly tight financial regulations being introduced by their banks, the clients are forced to revise their programmes and budgets of their ongoing projects while the new projects are put on hold or cancelled. Some clients may be forced to revise their project budgets by measures such as reducing the scope of works, revision of finishes (from luxury to ordinary) and so on.

The Economic Analysis techniques in Cost Engineering such as net present worth method, capitalized cost method, annual cash flow analysis, rate of return analysis, benefit–cost ratio analysis and payback period analysis shall provide clear guidelines to Clients in making important decisions with regard to the economic viability of projects. Many economic problems we face today have more than one possible solution or alternative. The concept of ‘equivalence’ in Engineering Economics could be used to compare the cash flows of the alternatives available at different points in time. Equivalence is based on the time value of money. The cash flows of the alternatives can be converted to similar lump-sum values or uniform series at a particular interest rate and at any given time using the principles of Economic Analysis.

Cost-Benefit Analysis (CBA) is a powerful, widely used and relatively easy tool for deciding whether to make a change or not. This method involves the simple

comparison between benefits and costs of a proposed action. Benefits are placed in the numerator and costs are placed in the denominator. If the ratio of benefits to costs is greater than one, the project is viable. Comparisons can be made between many projects to select those projects with the highest B/C ratio. Costs are generally one-off, or may be ongoing. Benefits are most often received over time. We build this effect of time into our analysis by calculating a payback period. This is the time it takes for the benefits of the change to repay its costs.

In the case of deciding whether or not to cancel a project all the costs associated with the cancellation need taken into account. These may include the following:

- Costs associated with preliminary surveys
- Consultant's fees
- Design costs
- Setting-up of temporary facilities
- Possible procurement costs
- Costs associated with penalties as prescribed in the Contract agreement in case of cancellation
- Opportunity costs (cost of the alternative lost due to cancellation)

The following information provided by the Cost Engineer will provide a good platform for the Client to take important decisions with regard to his projects:

- ROS – Return On Sales (Ideal tool for property developers to monitor over a period of time to judge where their businesses are heading)
- The Cost-Benefit analysis
- The current status of the project financially, in comparison with the cost plan
- Details on cost over-runs if any, and its cause and effect
- Point out unfavourable trends based on the available data and make recommendations for future actions, if any
- Forecast the cost to completion based on the costs foregone and projected future costs
- Recommend corrective actions to be taken, if any

b) Project Manager (and his team of Consultants that the Client hires for the execution of the project)

Project Manager organises and manages the project on behalf of the Client. In addition to co-ordinating client's decisions among various parties involved in the project

(eg: Architect, Structural Consultant, QS Consultant / Cost Engineer, MEP Consultant, Main Contractor etc.) , it is the Project Manager who updates the Client with the feedback from all these parties.

At the time of the global economic slowdown, Project Manager plays a significantly important role in assisting the Client to make important decisions with regard to the commencement of a new project or continuity of an ongoing project. This may be in the form of presentations on the financial viability of a new project based on current trends in the global market and reports on actual against planned progress(idea not clear), current cost versus budgeted costs and so on for an existing project. The Cost Engineer's role is quite significant here as all the important decisions with regard to project finance will be taken by the Client with the use of financial reports prepared by the Cost Engineer. For instance, the decision to go ahead with a new project or purchase of a particular plant/equipment for the project at a certain juncture will be taken by the Client after studying the cost analysis prepared by the Cost Engineer using his knowledge in the principles of '**Economic Costs**'.

Another Cost Engineering technique the Project Managers can utilise within the current economic turmoil is the **Earned Value Management (EVM)**. Earned Value Management is the process of integrating the project costs and the project schedule in order to measure actual performance and forecast future performance against an established baseline. With proper implementation of EVM, accurate measurement can occur at anytime throughout the project lifecycle. However, accuracy requires that a thorough Earned Value Management System is in place and is being utilized consistently throughout the project.

Project Managers are required to demonstrate to the Client that they effectively manage project costs. Through Earned Value Management they can answer the Client's question, "What am I getting for the money being spent?"

Utilizing EVM techniques does not prevent project costs overruns, but it does provide project managers with data for more effective cost and risk management, which has become increasingly important in today's scenario. Risks that are identified through the use of EVM provide early warning signals that imminent project risks exist⁴.

C) Contractors (and subcontractors)

In the ‘Tsunami’ of global economic meltdown, the Contractors could be the hardest hit in terms of lost revenue, reduced profit margins and loss of skilled manpower.

The first line of fire the Contractor receives is from his beloved Client in the form of cancellation of the project awarded a few months ago with no prior notice whatsoever. The reason we hear most often is common; ‘due to global financial crisis’. All the effort that the Contractor puts into the project over the past few months in the form of planning, procurement, recruitment, setting-up of offices etc. will be shot down with that powerful letter from the Client. The Client might promise that the works already carried out will be jointly recorded, evaluated and properly reimbursed, but, still the Contractor will end up on the losing side due to other indirect costs such as;

a) Recruitment costs – The cost spent on recruiting specialist personnel may not be fully recovered. It could be that the Contractor may have to terminate the employment contracts of some of these new recruits with a penalty payout for early termination.

b) Procurement costs – The Contractor may have placed an order for the full quantity of steel for the project just after the project’s award, which could be a few months before the meltdown began. That time the general conception in the market was that the price of a barrel of oil will exceed \$200 and the prices of other commodities will also follow suit. The unit price (per tonne) the Contractor agreed with the steel supplier could well be more than what he allowed in his tender which must have been submitted a good six months before the steel price shot up in the world market. By the time the Contractor receives the letter of cancellation of the project from the Client, the steel price in the world market has plummeted to as low as 25% of the price in peak. (Refer Chart No. 2 – Global steel price graph)

If the Client agrees to takeover all the steel delivered to site at the LPO price, then the Contractor’s woes are minimised. But this is very unlikely as most of the Contracts now demand for ‘just-in-time’ deliveries of major materials, plant and equipment.

Global Steel price graph.

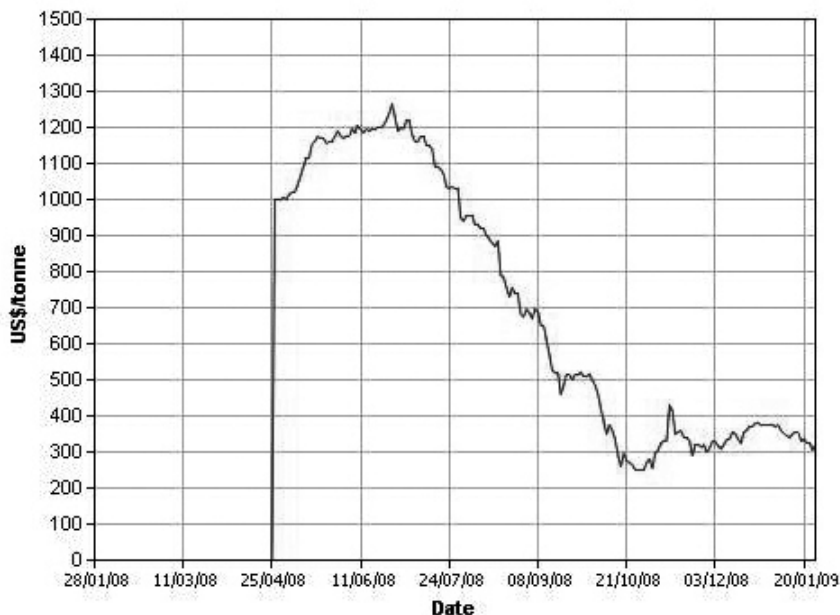


Chart No. 2 – The rise and fall of world steel prices in 2008

c) Opportunity cost – i.e. The cost of the jobs foregone. It could be that the Contractor has declined to submit tenders for a number of other projects offered by reliable clients with secured finances a few months ago, simply because he/she was so keen on this multi million dollar project he/she was concentrating on at that time. All his/her estimators were busy pricing this big project with such a prestigious Client which was finally won and awarded to the Contractor with much fanfare and announcements in the press. A few months into the project, the letter of cancellation arrives from the Client. The poor Contractor has no chance now to secure those smaller projects.

The second attack also comes from the beloved Client. This time in the form of non-issue of cheques by his finance department for the work already carried out and properly certified by the Consultants. The effect of this second line of fire will have a ‘domino effect’. The subcontractors and suppliers will be lining up at the Contractor’s office until their payments are released. The company will look into all the possible means of cost reduction techniques that may include scrapping of bonuses, increments, advertisement and reduction of overtime hours and so on. Depending on the severity of the financial situation many workers will also be made redundant.

In light of the current economic downturn, contractors will have little legal recourse if payments for on-going projects get delayed, legal experts say. According to a legal consultant in the United Arab Emirates, “Payments getting delayed will be a common feature in the market over the next six months. If the money isn’t there, there is very little a contractor can do about it. It is a risk they have taken. It is possible that certain contractors have taken payment security in the form of bonds or letters of credit, but that is extremely rare. Under UAE law a contractor can claim property against his/her unpaid dues. But, it is extremely difficult to get to that position as it requires a court order. The bottom line is that a contractor is left to chase the assets of the owner. Unfortunately, we will soon find out that insolvency laws are under-developed in the UAE. There is a huge inequality between a contractor and developer - if a contractor defaults, the employer has the ability to get the money from the bondsmen or the bank, conversely if the employer has to pay, there is no similar mechanism for the contractor⁵.”

d) Suppliers

In the Global financial crisis, the suppliers of materials and

services also suffer in varying proportions. The suppliers who rely on the Contractors for their businesses may affect in two ways. One, when the Contractor receives the letter of cancellation of the projects from the Client, he/she will pass it down the line to his subcontractors and suppliers, often cancelling the orders placed with them. Two, the loss a supplier (who is a stockist of materials such as Bar reinforcement in bulk quantities) will incur due to the falling of prices of major materials in the world market. The Cost Engineering principles of **Economic Order Quantity (EOQ) and Re-order Point (RP)** are handy tools for the supplier to manage his purchases efficiently which is a key to offering competitive prices in the market.

The principles of **Risk Management** in Cost Engineering provide a consolation for suppliers caught in this type of uncertain market conditions. Every major supplier must have a risk planning procedure in place with regard to his/her business. Broadly, the risk management procedure should include external, internal, strategic and tactical risks identified assessment criteria for occurrence and impact, analysis approaches and general mitigation strategies⁶.

Once a risk is identified and assessment criteria defined, a mitigation technique is to be chosen. In the example of the steel supplier losing money due to sudden reduction of prices in the world market could be mitigated by techniques such as ‘hedging’ or ‘insurance’.

Hedging is a specialized part of transfer where the risk of price fluctuations is assumed by a speculator through the purchasing and selling of futures contracts. It is assumed the commodity futures contracts are covered by an organized exchange, such as Chicago Board of Trade.

Insurance is a part of transfer but by companies that indemnify parties against specific losses in return for premiums⁷.

‘Silver lining in the dark cloud’ – What are the positive alternatives which could be implemented during the economic crisis?

The different parties discussed in this article could draw a lot of positives from the global economic downturn surrounding the world today.

- Clients could make use this opportunity to promote sustainable alternatives which are environmental friendly and having a smaller carbon footprint. According to an expert at the Reuters Global Environment Summit, “The current financial downturn could spur demand for sustainably designed buildings and communities. The heart of sustainability is conserving and not wasting, and this idea of getting clients to think about projects that are actually less expensive rather than more expensive and still sustainable these days gets a lot of good traction. It’s the environmental opportunity of a lifetime and if we don’t use it now as an opportunity to make the sustainable movement not just make progress, but gallop ahead, we’ve lost our chance⁸.”
- Project Managers, Architects, other Consultants and Contractors’ main aim during this period should be to control and reduce costs. They need to look at the scope for reducing costs, addressing which overheads are fixed (bills that will continue to fall due even if there is no work coming in) and which are variable (most significantly staff costs). Savings are likely to mean a reduction in staff, but they need to remember that redundancy is expensive (payout of gratuity etc.) and so is re-recruitment. Sharing resources with another practice could give a bit more flexibility during the difficult times.

Since Clients are also struggling with the same economic pressures, Consultants could give a thought to how to create value for them in the way that the service is delivered. i.e. “How do we get buildings up at minimum cost and maximum value?”

Another good idea may be, If possible, keep investing in training, research and development, and plan for the medium and long terms. Markets could bounce back any time and with different demands. It is necessary therefore to be ready to respond to those differences in the face of ever-growing competition on both quality and price.

- In the case of Suppliers, this could be the best time to re-evaluate their strategies. If the companies who purchase materials from the supplier is in a financial mess (may be due to not receiving due payments from Clients) there is a chance that the supplier may not get his payments for the materials already supplied. In such cases a little open dialogue and honesty can go a long way. It may be worth offering discounts or

renegotiating terms for the existing orders so that the chance of receiving overdue payments could be high. This would help them regaining the confidence of the Contractor who may continue business with them in the future. It will also be beneficial for them to review their insurance policies to avoid future losses in similar scenarios. It is also worth to study the option of hedging if such a cover does not currently exist for their supplies.

Conclusions

In this technical paper the writer has attempted to identify and analyse how the different parties involved in a Project are affected during the global economic crisis. It further develops into identifying the Cost Engineering techniques that could be used by the different parties to minimise the risks to their organizations during this era of economic uncertainty. Further, an attempt has been made to look into the possibilities of obtaining positive results based on sustainable development of the industry with the use of environmental friendly techniques. **Based on the suggestions made by the writer in the section titled ‘Silver lining in the dark cloud’, a follow-up study in detail could be beneficial for the future of the industry in general.**

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