

A Study of Performance Based Contracting (PBC) and the Highways Maintenance Management in Thailand

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Abstract

The main objective of this study is to determine a variety of Performance Based Contracting (PBC) techniques. In this study, different PBC components were reviewed and discussed. The key success factors in adoption and implementation, motives, perceived benefits and foreseeable complexity of PBC were carefully analyzed.

Also, in this paper, the author discusses the possibility of applying the performance based contracting to highways maintenance agencies in Thailand. From the study, it was found that the performance based contracting strategy generates a lot more benefits, throughout the whole project, in comparison with the normal contract strategy. These benefits result from the implementation of cost incentives for the contractor to work efficiently, the achievement of better value for money and more satisfying level of overall project performance in terms of cost, time and the number of disputes occur.

Keywords: highways maintenance, PBC, performance based contracting

Performance Based Contracting

Throughout the years, in construction and maintenance areas, there have been critics about the traditional design-bid-build procurement approach. The most common problems would be the fragmented working relationship and the lack of incentive for project team members to contribute more than just meeting the minimum contractual requirements (Masterman, 2002).

According to Crisil (2010), in the traditional method of procuring each of the steps in the procurement process (i.e., project planning, preliminary engineering, design, construction, operations and maintenance) independently optimizes the design and construction costs. Nevertheless, separately, all these independent optimizations do not guarantee the overall optimal solution, in terms of life-cycle cost, for the contractors and contracting agency. Out of necessity, the contracting agencies have to re-engineer work processes to control their costs of operations and to create cost and other incentives to push contractors to perform at the highest level of technical and managerial efficiency. It may be more appropriate if all the activities and its performance are measured based on delivery in terms of cost, time and quality. This is where Performance Based Contracting or PBC can be applied.

In the U.S. Office of Federal Procurement Policy (OFPP)'s Policy Letter 91-2, PBC was defined as “essentially structuring all aspects of an acquisition around the purpose of the work desired as opposed to either the manner by which the work is to be performed or broad and imprecise statements of work.”

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According to Crisil (2010), PBC is “a contracting technique where the key success factors (KSFs) are identified and the performance on the KSFs are ensured through rewards and penalties.” Whereas Martin (2000) stated that a PBC “focuses on the outputs and outcomes of service provision and may tie contractor payment, as well as contract extension, to their achievement”.

It has been observed that PBC has become more and more acceptable in government and state enterprises procurement technique. To effectively utilize PBC, critical elements of the project have to be well defined and statement of work (SOW) with achievable performance standards, methods of surveillance and percentage of the contract price each service represents have to be clearly written.

General Characteristics of PBC

Though PBC can be applied to procurement process several government agencies in many different areas, the common key characteristics of PBC John Cibinic, Jr. (1998), can be summarized as below:

- The outcomes or results of the project are defined in terms of performance expectations rather than the raw materials, methods, tools, systems and work activities.
- It is important that the formal and measurable performance standards, including surveillance plans, are clearly stated in the contract to facilitate the performance assessment as the compensations are closely connected with the desirable outcomes.
- Though it is necessary to clearly state a range of performance levels in the contract, the acceptable range must be defined. Some incentives need to be established in order to motivate contractors to increase the levels of performance to be higher than what have been expected in the past. Normally, the contract includes criteria that help motivate contractors to pursue opportunities to work, at fewer expenses, on tasks that other contractors could better perform. This technique could help contractors improve their performances and reliabilities.
- In the contractor selection process, it is recommended the contracting agency to carefully make judgment based on the technical and management capabilities, cost practicality and past performance of the candidates.
- When the PBC will be extended from one period of contract to the next, the level of expertise of the contractor will be higher. It is recommended that the contracting agency should incorporate experience gained and lessons learned in the previous contract into the new contract. Performance standards will be defined in more detailed terms and more disciplined arrangements than those in the prior period.

PBC and Its Key Elements

According to Cibinic (1998), there are two key elements that differentiate PBC from the traditional contracting technique, and could be critical to the success in implementation of PBC. They are:

- *The Statement of Work (SOW)* consists of the specifications and other portions of the contract that describe the required performance. It helps the contracting agency determines which part of its mission requirements is to be performed by the contractor. The SOW helps both the contractor and contracting agency in estimating the cost of performance. The SOW is the critical component for determining whether the contractor has achieved the required results and whether the government entity is required to accept the performance, or not. This, in turn, would directly indicate whether the contractor will receive payment of the contract fee, or not.

- *Performance Work Statement (PWS)* must clearly define the work to be done and the performance standards expected (quality, quantity, and timeliness). The PWS should also define the satisfactory level of performance, and provide a range of acceptable performance, as applicable. It must contain the key elements for administration after the contract is awarded. Moreover, it must address in necessary details in the performance evaluation management plan. Essential elements include the systematic basis for acceptance and rejection of each performance effort, the identification or fundamental of the cost of effort, and a guideline or rule for withholding of fee for unsatisfactory performance.

PBC in Highways Maintenance Management

Highway agencies around the world are undergoing major changes in their traditional maintenance practices, including the privatization of entire sections of highway routine maintenance activities. PBC is an option in such privatizing efforts.

The World Bank Group (2009) had a major role in supporting the uses of PBC in highways maintenance management projects around the world. In Stankevich et al. (2005), World Bank defined PBC in terms of highways maintenance as “a type of contract in which payments for the management and maintenance of road assets are explicitly linked to the contractor successfully meeting or exceeding certain clearly defined minimum performance indicators.”

According to Stankevich et al. (2005), several advantages that PBC has over the traditional contracting techniques are such:

- Cost savings in managing and maintaining highway assets;
- Greater expenditure certainty for highway agencies;
- Ability to manage the road network with fewer agency staff;
- Better customer satisfaction with highway service and conditions; and
- Stable multi-year financing of maintenance.

In Anastasopoulos et al. (2009), a methodology to estimate the likelihood and amount of cost savings associated with the application of PBC for highway maintenance operations were presented. The models were developed, by using data on maintenance contracts from around the world, to compare several contracting methods and variables such as contract duration, activity type and contract size. Their study found that large projects with strong competition, long duration and extension periods, long outsourced road sections, that incorporate crack sealing, pothole repair, illumination repair/maintenance, and mowing activities, favor outsourcing under PBC. Their methodology can be very useful to transportation agencies for making decisions about whether to use PBC or other methods of maintenance contracting.

The World Bank Group (2009), on the other hand, offered WB Sample Bidding Documents [8], which consists of bidding documents from four government organizations that procure highways maintenance management by using PBC. Their intention was to help the new government organization that would like to implement PBC to have a good starting point. In the packages, there are examples of a request for contractor qualifications, maintenance standards, and etc.

The four samples came from World Bank financed projects in Cambodia (for national roads in 2004); Serbia and Montenegro (hybrid contract, for main and regional roads in 2004); Madagascar (contracts to maintain all season roads are underway); and Tanzania (for unpaved all season roads in 2005). It is also suggested that if the readers want to see some different approaches, they should find the bidding documents prepared in New Zealand (in 2005); and Washington, D.C, USA (in 2000).

According to Pakkala (2005), highway agencies that have adopted PBC could experience a cost savings from 10 percent up to 40 percents as shown in Table 1 below.

Table 1. Cost Savings of Different Countries under PBC over the Conventional Contracts
(Source: Pakkala, 2005)

Country	Cost Saving, %
Norway	About 20-40%
Sweden	About 30%
Finland	About 30-35%; about 50% less cost/km
Holland	About 30-40%
Estonia	About 20-40%
England	10% minimum
Australia	10-40%
New Zealand	About 20-30%
USA	10-15%
Ontario, Canada	About 10%
Alberta, Canada	About 20%
British Columbia, Canada	Some, but might be the order of 10%

Highways Maintenance Applications

In Thailand, there are few main government agencies responsible for public roads and highways construction and maintenance. They are Department of Highways (DOH), Department of Rural Roads (DORR) and Bangkok Metropolitan Authority (BMA). Among these three, the DOH is the main agency as they have to responsible for planning, designing, constructing and performing maintenance on approximately 55,000 kilometers of highways around the country.

In 2001, DOH under the World Bank or the International Bank for Reconstruction and Development (IBRD) loan has commissioned a consulting to conduct a study of "Strengthening of DOH's Management and Updating of Long Term Strategic Investment Plan". The result of this study suggested the implementation of PBC technique.

Consequently, the DOH intended to implement a pilot project on PBC by establishing highways maintenance contracts in three different areas, where each area of study will

contain approximately 300 kilometers. Unfortunately, the pilot project was disrupted due to some internal difficulties.

As for the other two government highways agencies, the BMA acquires larger road networks and usually receives higher amount and quite stable maintenance budgets when compared with the DORR. Furthermore, as most of roads under BMA responsibility are in Bangkok metropolitan area, there is a higher need for BMA to meet with customers or public satisfactions. With all points considered, BMA should be the next organization with higher possibility in adopting the PBC technique.

As recommended by Stankevich et al. (2005), for any organization to adopt the PBC, there are certain steps to follow:

- Establish an asset management system, where this system can help accurately determine the road and assets conditions, and define the performance indicators or serviceability indexes of the road assets.
- Set up payment conditions.
- Set up contract conditions.
- Conduct preliminary cost estimates.
- Bid evaluation and selection.

Nevertheless, there are still many challenges to be concerned by both contracting agency and contractors after the PBC has been awarded. Some of them will be discussed in the subsequent section.

Key Success Factors and Points of Considerations

From the reviews, the keys to successfully implement PBC are:

- Commitment from high management level
- Skills and expertise pertained by road agency staff
- Reliable and capable contracting agency
- The working environment allows for contracting and partnering
- Stable funding throughout the contract duration
- The PBC generic principles and format can be modified to support the local requirements of each country.

Following are some points for the government agencies to consider if the PBC is to be applied:

- There are risks involved in conducting the PBC
- Partnership between the contractor and contracting agency is necessary. Therefore, the highways agency may need to alter their mindsets to be more strategic thinking rather than detailed management.
- The government staff needs to acquire new skills and expertise to be able to effectively develop and manage a PBC.
- The number of government staff may be significantly reduced as there will require a lot less effort to develop and supervise PBC projects.
- It is necessary for both parties to clearly define the performance specifications. In this respect, the government personnel needs to have good knowledge to be able to clearly state the desired level of performance and conditions in the contract. Further, the contract needs to be written in such a way that it motivates contractor to continuously meet or exceed the desired level of performance.
- In some countries, like Thailand, the budgeting process is managed annually. This could be a practical problem for PBC as it requires a multi-year contract. Nevertheless, this problem may be resolved by either the government agency can get some political supports or they could seek for financial help from an

international financial institute like World Bank, ASIAN Development Bank (ADB) or etc.

Conclusion and Discussions

Performance Based Contracting technique or PBC is certainly a very valuable technique as it provides a lot of benefits to the project cases, as previously discussed. Nevertheless, there are still many points that government organization needs to consider as previously discussed.

PBC has been very successful in many countries and is a procurement technique recommended by the World Bank. However, if the highways agencies in Thailand wish to adopt this technique to their maintenance management system, there are still a lot of works to be accomplished before PBC can be fully utilized, e.g., the assets management system, legal issues, tender evaluation criteria, SOW, PSW and etc. It is recommended that the highways agencies should perform a thorough research and analysis before committing into the implementation phase.

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Bibliography

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