

Identifying the Benefits and Difficulties of Implementing Target Cost Contracts in the Construction Industry

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Abstract

The construction industry has been traditionally beset with a number of potential problems, such as the lack of co-operation, mutual trust and effective communication, resulting in adverse overall project performance. To achieve better value for money during the project delivery process, guaranteed maximum price (GMP) and target cost contracting (TCC) with a gain-share/pain-share arrangement have been successfully applied in the United Kingdom and Australia. However, there still exhibits a lack of research evidence to evaluate the levels of success and lessons learned from those GMP/TCC projects. Based on a series of in-depth interviews on the perceptions of experienced industrial practitioners, this paper aims to explore the key characteristics of GMP/TCC including the underlying motives, perceived benefits and potential difficulties of implementing this form of project procurement in the Hong Kong construction industry. The research findings provide some useful insights to assist key project stakeholders in maximizing the benefits derived from and minimizing the detriments brought about by potential difficulties in implementing GMP/TCC concepts.

Keywords: Guaranteed maximum price, Target cost contracting, Procurement strategies, Gain-share/pain-share arrangement, Interview survey, Hong Kong

1. Introduction

The construction industry has long suffered from a lack of co-operation, limited trust and ineffective communication, often resulting in an adversarial working relationship amongst all project stakeholders, and finally leading to unfavourable project performance (Chan *et al.*, 2004). Innovative procurement methods have therefore been developed in construction since the 1990s to satisfy the changing needs of clients and to improve project performance (Masterman, 2002). Previous overseas successful cases demonstrate that guaranteed maximum price (GMP) and target cost contracting (TCC) procurement strategies can derive a plethora of benefits to all of the parties involved, provided they are properly structured, implemented and managed (Trench, 1991; Walker *et al.*, 2000).

Although GMP and TCC have been practiced in western countries for several years, and a number of construction projects are applying the concept, not all these projects have been equally successful as anticipated. In addition, literature about the practices of GMP/TCC in overseas countries is extensive. However, there is very limited empirical research to evaluate the levels of success and lessons learned from those GMP/TCC projects, especially in the Hong Kong context. Therefore, according to a series of in-depth interviews on the perceptions of key project stakeholders, this paper aims to investigate the key characteristics of the GMP/TCC procurement approach including the underlying motives, perceived benefits and potential difficulties. GMP/TCC is at a germinating stage of development in Hong Kong and thus such a local comprehensive investigation is found to be valuable and timely.

2. Definitions of GMP/TCC

GMP/TCC is an incentive-based procurement strategy which improves risk management and control, as well as encourages the contractor to save costs through injecting expertise and innovative ideas in both design and construction.

2.1 Target Cost Contracting (TCC)

Trench (1991) advocated that “under a target cost contract, the actual cost of completing the work is evaluated and compared with an estimate or target cost of the work and the differences within a cost band are shared between employer and contractor”. The UK National Economic Development Office (1982) regarded that “target cost contracts specify a best estimate of the cost of the work to be carried out. During the course of the work, the initial target cost will be adjusted by agreement between the client or his nominated representative and the contractor to allow for any changes to the original specifications. Differences between target cost and actual cost at completion are shared between the parties to the contract”.

TCC is a unique arrangement that shifts from the fixed price approach to a target cost approach based on joint determination and agreement between the client and the contractor on the allocation of shared risks. Figure 1 illustrates the pricing mechanism of TCC.

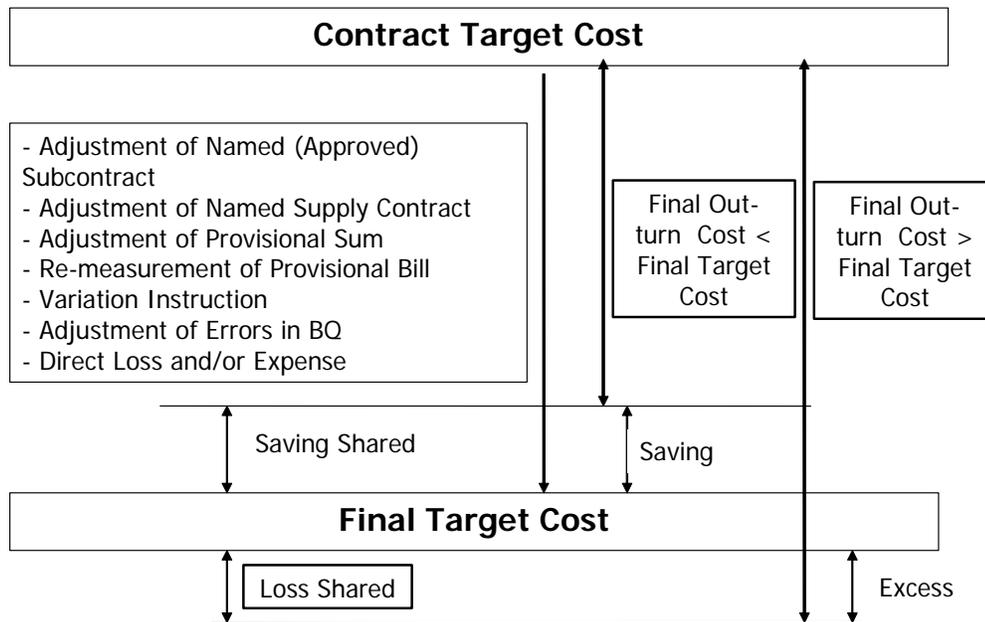


Figure 1: Pricing Mechanism of TCC Procurement Strategy [adapted from Cheng (2004)]

2.2 Guaranteed Maximum Pricing (GMP)

Carty (1995) perceived that “the contractor and owner agree that the contractor will perform an agreed scope of work (defined as best as possible) at a price not to exceed an agreed upon amount, the guaranteed maximum price (GMP) if these costs and the agreed upon contractor’s profit are less than the GMP, the owner and contractor will share the savings in cost based upon an agreed upon formula.

If the costs exceed the GMP without any changes to the defined scope, the contractor must solely bear the additional cost". Kerzner (1995), as cited by Ferreira and Rogerson (1999), defined GMP as "..... the contractor is paid a fixed fee for his profit and reimbursed for the actual cost of engineering, materials, construction labour, but only up to the ceiling figure established as the 'maximum guaranteed'. Savings below the maximum guaranteed are shared between owner and contractor, whereas the contractor assumes the responsibility for any overrun beyond the guaranteed maximum price."

GMP is considered to be one of the forms of TCC with the sharing arrangement limited solely to the gain (Perry and Thompson, 1982). Figure 2 illustrates the pricing mechanism of GMP.

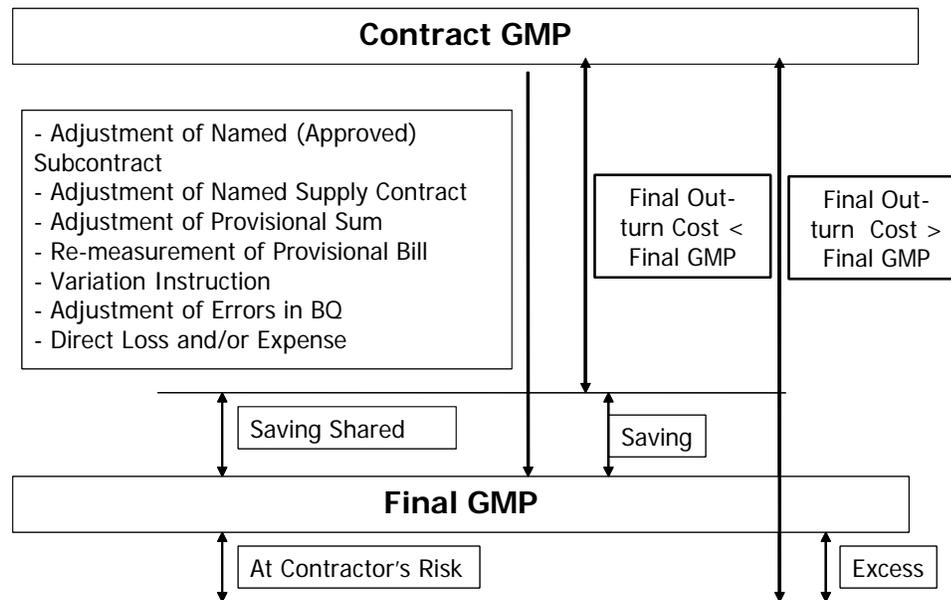


Figure 2: Pricing Mechanism of GMP Procurement Strategy [adapted from Cheng (2004)]

3. Characteristics of GMP/TCC

Chan *et al* (2006) summarized the key characteristics of the GMP/TCC procurement strategy as follows:

- Set an agreed ceiling price of the project at main contract award for the client.
- Guarantee timely project completion by allowing early start of construction before the design is fully developed.
- The client retains greater control over design consultants, main contractor and subcontractors.
- Bring in expertise in building designs and innovations in construction methods and materials from the contractor to enhance the buildability of project.
- The contractor will price for any risks associated with design development likely to be incurred under GMP/TCC allowance.
- The client provides financial incentives for contractor to achieve cost saving.
- Set up the Adjudication Committee to facilitate the resolution of various issues and disputes.
- Develop common goals for various project stakeholders under a partnering arrangement.
- Early settlement of final project account.
- 'Open-book' accounting arrangement to enhance the accountability and quantification of the costs of risks.

4. Interview Survey

With the purpose of exploring the application of GMP/TCC practices in Hong Kong, a series of semi-structured face-to-face interviews were undertaken with relevant industrial practitioners in construction. The leading property developers and major construction firms were targeted for this study. Amongst these target groups, a total of eight construction-related organizations were approached according to their abundant hands-on experience in using GMP/TCC form of procurement. Altogether eight individuals (including clients, contractors and consultants) were interviewed between January and April of 2006. The details of the interviewees are given in Table 1.

The interviews were flexibly structured to allow for free flow of ideas because all of the interviewees were at senior management level with sufficient practical experience in delivering GMP/TCC projects. The following open-ended questions were asked to solicit their opinions on the subject matter:

1. What are the motives behind the decision to implement GMP/TCC?
2. What are the major benefits of applying the GMP/TCC approach?
3. What are the potential difficulties encountered when implementing the GMP/TCC approach?

Table 1: Details of Interviewees for GMP/TCC Procurement Strategy

ID	Sector	Organisation Type	Position of Interviewee
1	Private	Client	Executive Director (Projects) and Head of Quantity Surveying working for a leading property developer.
2	Private	Consultant	Director from a quantity surveying consultant firm.
3	Private	Client	Project Manager working for a leading property developer.
4	Private	Client	Project Manager working for a leading property developer.
5	Private	Contractor	Head of Planning and Pre-construction Engineering and Construction Manager working for a major construction company.
6	Quasi-government	Client	Contracts Administration Manager from a quasi-government railway service provider.
7	Quasi-government	Client	Chief Executive Officer of a subsidiary of a quasi-government railway service provider.
8	Public	Client	Senior Architect working for a public sector housing developer.

Note: Names of the interviewees are not disclosed in the interest of privacy

The information acquired from the interviews was first audio-recorded and later transcribed into written dialogues. The interview dialogues were then forwarded back to corresponding interviewees for verification through email transmission. Results derived from the analysis of interviews were cross-referenced to the published literature and to complement each other.

5. Interview Findings and Discussion

Table 2 consolidates the key findings of the interview survey on the aforesaid three research questions as gleaned from the eight interviewees with various roles in the GMP/TCC projects in Hong Kong.

Table 2: Summary of the Interview Findings on GMP/TCC Procurement Strategy

Areas of Interest		Client 1	Consultant 1	Client 2	Client 3	Contractor 1	Client 4	Client 5	Client 6	Total no. of hits
Motives to adopt GMP/TCC	To improve risk management and control	✓	✓	✓			✓	✓	✓	6
	To generate an incentive to achieve cost saving and work efficiently	✓	✓		✓	✓			✓	5
	To tap in contractor's expertise in design and construction methods		✓	✓		✓	✓		✓	5
	To develop better working relationship	✓			✓				✓	3
	To set an agreed ceiling price at main contract award	✓	✓	✓						3
Benefits of GMP/TCC	Provide financial incentives for contractor to achieve cost saving and innovate	✓	✓		✓			✓	✓	5
	Bring in expertise in building designs and innovations in construction methods from contractor to enhance the buildability of the project	✓		✓		✓	✓			4
	Conducive to improving partners' working relationship via partnering	✓	✓	✓	✓	✓	✓		✓	7
	Enable a more equitable risk apportionment amongst project participants	✓	✓			✓	✓	✓	✓	6
	Limit the entitlements for claiming variations by contractor	✓		✓	✓					3
	Early settlement of final project account	✓	✓	✓	✓				✓	5
Difficulties of GMP/TCC	Difficult to develop trust and understanding from contractor as a project team	✓							✓	2
	Unfamiliarity with or limited understanding of GMP/TCC concepts by project team members	✓		✓		✓	✓	✓		5
	Arbitrary to determine whether Architects/Engineers Instructions constituted GMP/TCC variations or were deemed to be design development	✓	✓	✓	✓				✓	5

5.1 Motives Behind to Adopt GMP/TCC

The target cost contracting concept was introduced to provide a price ceiling of the project and thereby improving risk management and control for the client. Furthermore, most of the interviewees agreed that the inherent gain-share/pain-share mechanism generating financial incentives for the contractor to achieve cost saving and work efficiently was the key driver to implement this novel procurement strategy.

Integrating contractor's expertise and innovations in both design and construction is another strong motive behind to introduce GMP/TCC. With the early appointment of contractor in design development, not only site activities can commence before finalizing the entire project design, but also the enhancement of buildability and environmental issues can be incorporated into the design.

Additionally, the client adopted the GMP/TCC procurement approach for improving the traditional confrontational working relationship amongst project team members. Under the GMP/TCC umbrella, a set of common goals are developed amongst the client, consultants, main contractor and trade

subcontractors through a number of partnering workshops. This shared vision and the 'open-book' accounting regime foster a sense of partnership and a degree of mutual trust between project stakeholders.

5.2 Perceived Benefits of GMP/TCC

Seven out of the eight interviewees held a unanimous consensus that GMP/TCC could cultivate more harmonious working relationship within the project team, because GMP/TCC together with the partnering philosophy facilitated deep collaboration between the client and the contractor. Regular partnering review meetings and the adjudication committee operated under the GMP/TCC umbrella also provided a strong foundation to discuss any difficulties encountered and mitigate pointless conflicts. The GMP/TCC arrangement also offered a more equitable mechanism of risk allocation among various project participants under the partnering spirit, as advocated by both the client and the contractor.

The gain-share/pain-share philosophy associated with TCC also generated an enormous impetus for the contractor to innovate, save cost and solve problems as highlighted by Boukendour and Bah (2001). In particular, the contractor interviewee (Contractor 1) stressed that the early participation of the contractor could not only improve the buildability of project by integrating the design and construction, but also allow advanced programme planning for to accelerate the construction process.

Clients perceived that the contractor was more willing to accept project variations and additional works because of the 'open-book' accounting arrangement. The 'open-book' accounting strategy also resulted in early settlement of final project account, primarily because a wide variety of possible variations have been pre-agreed and pre-defined in the construction contract which led to the reduction of disputes and claims (Gander and Hemsley, 1997).

5.3 Potential Difficulties of GMP/TCC

Almost all of the interviewees concurred that determining whether Architects/Engineers Instructions are categorised to be GMP/TCC variations or design development variations was a significant problem with using GMP/TCC. Under the conditions of GMP/TCC contracts, design development variations would not instigate an adjustment of the GMP value or the target cost because they are deemed to have been covered in the fixed lump-sum price of main contractor's direct works, but GMP/TCC variations can arise due to changes in the scope of work (Fan and Greenwood, 2004). Besides, the extent of design development variations would also be difficult to define. Improper handling on these issues may certainly provoke intractable disputes and diminish the mutual trust established amongst project participants.

Moreover, some practitioners advocated that it was not easy to develop harmonious working relationship and build up mutual trust among contracting parties due to the misalignment of their own financial objectives under the traditional procurement arrangement. Inadequate understanding of GMP/TCC concepts by consultants and subcontractors was seen to be another potential obstacle which might adversely affect the proper implementation of GMP/TCC.

6. Concluding Remarks

The Hong Kong construction industry has been characterized by fragmented working culture and adversarial working relationship, the tendency to award contracts to the lowest bidders, and non value-adding multi-layered subcontracting for several years, resulting in poor quality of constructed facilities (CIRC, 2001). Hands-on experience derived in the local context indicated that guaranteed maximum price (GMP) and target cost contracting (TCC) approaches can accrue considerable mutual benefits to all of the parties involved. GMP/TCC aims to develop a co-operative teamwork approach based on a partnering working relationship. Both private sector and public sector property developers are now considering a

wider adoption of GMP, together with the infrastructure sector using TCC in order to deliver projects within schedule, within budget, with high quality and far less disputes or claims.

This paper has reported based on empirical case studies and perceptions of various project stakeholders via a series of face-to-face interviews. The key issues related to the GMP/TCC procurement strategy discussed include the underlying motives behind adopting GMP/TCC, perceived benefits and potential difficulties. The research findings are useful in assisting key project stakeholders in minimizing the detriments brought about by potential difficulties in and maximizing the benefits derived from implementing GMP / TCC concepts.

This study is also significant in contributing to new knowledge and practical information of novel contracting strategies for the construction industry so as to drive for excellence in overall construction performance. A follow-up empirical questionnaire survey on the GMP/TCC approach had also been completed and the key survey findings will be disseminated through subsequent publications, e.g. journal articles, conference presentations and research monographs.

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References

- Boukendour, S. and Bah, R. (2001) The guaranteed maximum price contract as call option. *Construction Management and Economics*, 19(6), 563-567.
- Carty, G.J. (1995) Construction. *Journal of Construction Engineering and Management*, ASCE, 121(3), 319-328.
- Chan, A.P.C., Chan, D.W.M., Fan, L.C.N., Lam, P.T.I. and Yeung, J.F.Y. (2004) *A Comparative Study of Project Partnering Practices in Hong Kong*. Summary Report, Construction Industry Institute – Hong Kong, Research Report No. 1, 40 pages, ISBN 988-98153-1-1, September 2004.
- Chan, D.W.M., Chan, A.P.C., Lam, P.T.I., Lam, E.W.M. and Wong, J.M.W. (2006) Exploring the application of target cost contracts in the Hong Kong construction industry. *In: Proceedings of the 31st AUBEA Conference*, 12-14 July 2006, University of Technology Sydney, Australia (CD-Rom Proceedings).
- Chan, D.W.M., Chan, A.P.C., Lam, P.T.I., Lam, E.W.M. and Wong, J.M.W. (2007) An interview survey for evaluating guaranteed maximum price and target cost contracting strategies in construction. *Journal of Financial Management of Property and Construction*, submitted on 13 February 2007 under review.
- Cheng, Rebecca L.L. (2004) *Investigation of the Application of Guaranteed Maximum Price in the Hong Kong Construction Industry*. Unpublished BSc(Hons) Dissertation in Construction Economics and Management, Department of Building and Real Estate, The Hong Kong Polytechnic University, Hong Kong, 58 pages.

- CIRC (2001) *Construct for Excellence*. Report of the Construction Industry Review Committee, Hong Kong SAR, 207 pages.
- Fan, A.C.W. and Greenwood, D. (2004) Guaranteed maximum price for the project? *Surveyors Times*, The Hong Kong Institute of Surveyors, March, 20-21.
- Ferreira, R.M.L. and Rogerson, J.H. (1999) The quality management role of the owner in different types of construction contracts for process plant. *Total Quality Management*, 10(3), 401-411.
- Gander, A. and Hemsley, A. (1997) Guaranteed maximum price contracts. *CSM*, January, 38-39.
- HKHA (2006) *Internal Guidelines for Guaranteed Maximum Price Contract Procurement Based on Private Sector Model*, The Hong Kong Housing Authority, Hong Kong SAR Government, 19 pages.
- Kerzner, H. (1995) *Project Management – A Systems Approach to Planning, Scheduling and Controlling*, 5th Edition, New York, Van Nostrand.
- Masterman, J.W.E. (2002) *Introduction to Building Procurement System*, 2nd Edition, London New York Spon Press.
- NEDO (1982) *Target Cost Contracts – A Worthwhile Alternative*. Civil Engineering Economic Development Committee, National Economic Development Office, UK: London.
- Perry, J.G. and Thompson P.A. (1982) *Target and Cost-reimbursable Construction Contracts*, CIRIA Report R85, London: CIRIA.
- Trench, D. (1991) *On target – A Design and Manage Target Cost Procurement System*. London Thomas Telford.
- Walker, D.H.T., Hampson, K.D. and Peters, R. (2000) *Relationship-based Procurement Strategies for the 21st Century*. AusInfo, Canberra, Australia, ISBN 064243079-9, 112 pages.