

Collaborative Integrated Project Team – A New Approach to Project Delivery

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Abstract – Projects in the power supply business are becoming increasingly challenging. Performance expectations of stakeholders are rising and Project Managers and Project Teams in today's industry must deliver greater value than ever before while working to the highest safety, health, environmental, ethical and social standards.

The traditional project environment in any industry demands that a significant proportion of available resources are used in areas that have minimal direct input into the final outcome or the final deliverables of the project. Reducing effort here enables resource to be directed into areas that will very positively affect project outcome including safety management, health and environmental management, quality management and risk management.

In recent years “Partnering” has appeared as an alternative contracting methodology. Collaborative Integrated Project Team (CIPT), a Partnering Derivative, has been specifically developed for the CLP Power operating environment, Hong Kong construction market and the worldwide electrical equipment supply market. It focuses upon exploiting the attributes of a partnering relationship that can realistically be achieved at this time while providing a road map to full partnering relationships with our business partners.

This paper explores and explains the CIPT model covering the organizational structure, relationship models and techniques available to achieve project goals. A three-way viewpoint will be presented with experiences of CLP Power, Hip Hing (Civil Solution Provider) and Xian Electric (Electrical Solution Provider).

Starting with “brown field” switchboard replacement projects CLP Power CIPT experience has now expanded to include major substation turnkey contracts whereby CLP Power, Hip Hing and Xian Electric will together deliver a number of green field and brown field substation projects representing a very significant commitment by all three parties to this innovative contracting technique.

Index Terms – Collaborative Work, Contracts, Environmental Factors, Project Management, Risk Analysis, Safety, Switchgear

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Introduction

CLP Power Hong Kong Limited (CLPP) supplies electricity to 2.2 million

customers in Kowloon the New Territories and most outlying islands of the Hong Kong Special Administrative Region with a service area covering about 1,000 square kilometers.

Hip Hing Construction (Hip Hing) was founded in Hong Kong in 1960 by Dr. Cheng Yu-Tung, Dr. Sin Wai-Kin and Mr. Yan Kao and has grown steadily under the leadership of Mr. Chan Kam Ling to become one of the most competent and active construction groups in Hong Kong.

China Xian Electric Group (Xian Electric) is one of the largest electric

groups in China, and well known for manufacturing all kinds of high voltage power transmission, transformation and distribution equipment. As world leaders in project management, construction and electrical equipment supply the three businesses of CLPP, Hip Hing and Xian Electric have engaged in an innovative “partnering” contracting arrangement to deliver added value to all stakeholders while operating under the highest safety, quality, governance and ethical standards.

This “partnering” arrangement has been termed the Collaborative Integrated Project Team (CIPT) approach. This paper will describe the facets of the contracting model including relationship techniques and collaborative tools, experience in operating in a collaborative environment from a viewpoint of both customer and contractor and finally will provide a brief overview of the results obtained to date.

Collaborative Integrated Project Team (CIPT)

The Collaborative Integrated Project Team (CIPT) approach adopts a specific relationship model aiming at high performance. This is delivered through an open and transparent business environment driven by common goals, mutual benefit and enlightened self interest. The model can be broadly divided into

- Project Organisation - CIPT Governance Structure built around “one team”.
- Relationship Behavior.
- Tools & Mechanisms to facilitate and incentivise collaboration.

A. Project Organisation

CIPT is a “people driven” approach and success depends upon the establishment of a committed, skilled &

diverse project team that enables each member to maximize their contribution to the project. The essence of CIPT is an integrated project team structure that minimizes the Customer/Contractor skill and resource duplication that can exist in a more traditional contracting arrangement and instead adopts a “best able to resource and manage the task” approach. This simply means that the project team comprises a mix of Customer and Contractor staff each selected based as far as possible upon expertise, with less emphasis on business affiliations. Focus is on project delivery with a one team approach enabling less resource to be assigned to checking and verification of the deliverables of other parties. Under the CIPT model this allocation of resource is established in the earliest stages of the procurement phase by developing a clear understanding of which parts of the customer and supply markets are best able to manage each project task; and then designing a tendering process and a project structure to suit these findings.

Once in the project implementation phase the team comes together under a basic governance structure as described below.

The overall project team structure is divided into three sub groups each with specific roles and responsibilities.

1. Project Leadership Team (PLT): The PLT comprises senior managers of the major stakeholders and focuses

upon project leadership, governance and policy.

2. Project Management Team (PMT) comprises the individual project managers and key functional managers of the major stakeholders and focuses upon the management of relationships, risk, objectives, issue resolution, innovation and performance.

3. Wider Integrated Project Team (WIPT) comprises the project team members responsible for design, manufacturing, installation, commissioning and all other aspects of the project delivery process. The critical characteristics that each team is expected to exhibit within its own group and through interaction between groups are:

- Open, honest and timely communication.
- Proactive problem solving (within the team)
- Joint resolution of issues (within the team)
- Best for project approach

B. The CIPT Business Relationship

CIPT targets a specific relationship between CLPP, Hip Hing & Xian Electric. It is not a “Partnering” relationship in the generally recognized meaning of the term but it does exhibit a large number of the characteristics that would normally be associated with Partnering Contracts. Specifically it is a business relationship that is built upon:

- Mutual Trust Based On Competence, Character, Interdependence, Honesty & Integrity
- Good Faith, Shared Vision, Common Goals & Strategies
- Team Based Responsibility & Accountability
- Performance Based Remuneration, Shared Risk, Joint Benchmarking
- Leveraging Core Competencies
- Shared Governance, Joint Leadership, Mutually Accountable

These characteristics have been fixed in the project and in the project team through the establishment of and commitment to a Project Charter and in particular through the development of the Project Guiding Principles which form the moral agreement for actions and behavior by the integrated project team.



Fig. 2. Project Charter

An earlier pilot CIPT project operated around a simple customer-supplier relationship with a contractual relationship operating in parallel to a collaborative relationship.

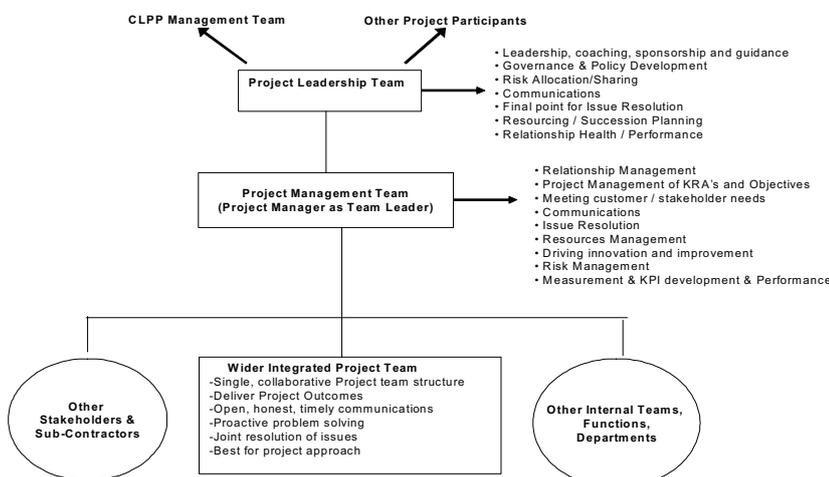


Fig. 1. Collaborative Integrated Project Team Structure

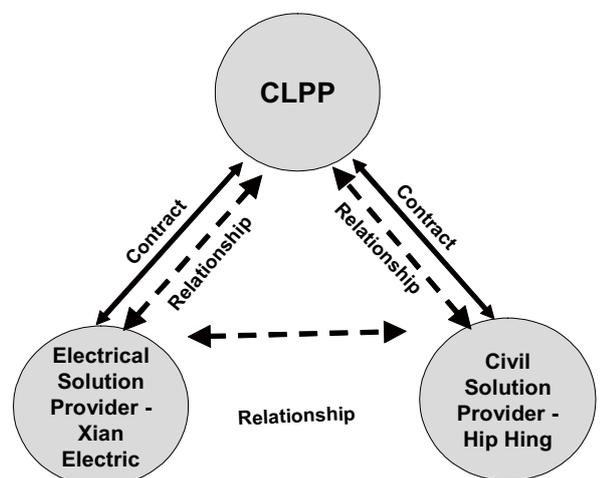


Fig. 3. CIPT Tri-Party Model

The development described in this paper has taken a further step with a more sophisticated three party arrangement. Under this arrangement a contractual relationship exists only between CLPP and each of the solution providers whereas a collaborative relationship exists between all three stakeholders.

Risk Sharing & Key Performance Indicators

CIPT has been developed to deliver high performance and to produce better outcomes than could be achieved under other contracting arrangements; better being broadly defined as safer, greener, higher quality and reliability, lower outturn cost (for the customer) and higher margins (for the contractor). These are objectives that are often viewed as mutually exclusive. For this reason measurement of performance plays a key role, for it provides the mechanism to reward high and outstanding performance by the contractor and supplier with the inference that high performance equals safe, reliable and within budget.

Key Performance Indicators have been established that provide a measure of the project. Hip Hing and Xian Electric

are paid a sum on top of fair cost, overhead and margin depending on measured performance against KPI's. The difference under the CIPT model is that the total sum available for this payment depends upon how effectively the integrated project team has managed risk.

The important feature of this model is that any additional sums payable are achieved through effective and joint management of risk. This delivers a risk outturn cost which is lower than the established risk contingency and releases funds that are then shared amongst stakeholders according to performance.

Civil and Electrical Solution Contractor Perspective

Hip Hing has built 10 transmission substations for CLPP in the last four years. Both "traditional" and "design and build" procurement approaches have been adopted for these projects. The overall performance, in terms of timely completion, cost (and profit), safety and environment management, has been to the highest standard required by both CLPP and Hip Hing. Although not labeled as "Collaborative" projects this success has supported the development of a

positive business relationship and mutual trust which has been maintained and enhanced from project to project.

The business relationship between Xian Electric & CLPP dates back to 1999 when the first 132kV Power Transformer was delivered to Hong Kong. This relationship has developed during the last 6 years with the last of nine electrical solution

substation projects ordered under a previous traditional contract having been commissioned at the end of 2005.

Recently Hip Hing & Xian Electric were engaged by CLPP through a competitive tendering process to build further transmission substations using the new CIPT approach. This was aimed at achieving better outcomes as described in the previous paragraphs.

In the new Transmission Substation Projects, there is a "contractual" collaborative relationship between CLPP and Xian Electric and between CLPP & Hip Hing while there is a voluntary collaborative "strategic partnership" between Hip Hing and Xian Electric. In both types of arrangement all participants have agreed to work together to achieve common goals and to share risks & benefits.

A single contract for the provision of civil and electrical solution elements of these transmission substations has been established with both partners and with individual projects commencing according to a framework programme. At present, purchase orders to design and build a number of substation projects have been received by Hip Hing & Xian Electric with one having already reached the civil construction phase.

It is too early in the contract cycle to meaningfully evaluate the benefits gained and draw any firm conclusion on the CIPT model. However, this CIPT model does have significant impact in terms of pricing (tendering) and construction project management. These are discussed below.

A. Tendering of CIPT Project

The procurement phase followed an accepted Request for Proposal (RFP) format. Since tendering a project using the CIPT model was new to almost all tenderers, CLPP conducted a Pre-bid Communication Session shortly and a CIPT experience sharing session after issuing the RFP. Tender submissions were made approximately 10 weeks after the issuance of the RFP. The tender assessment period was relatively

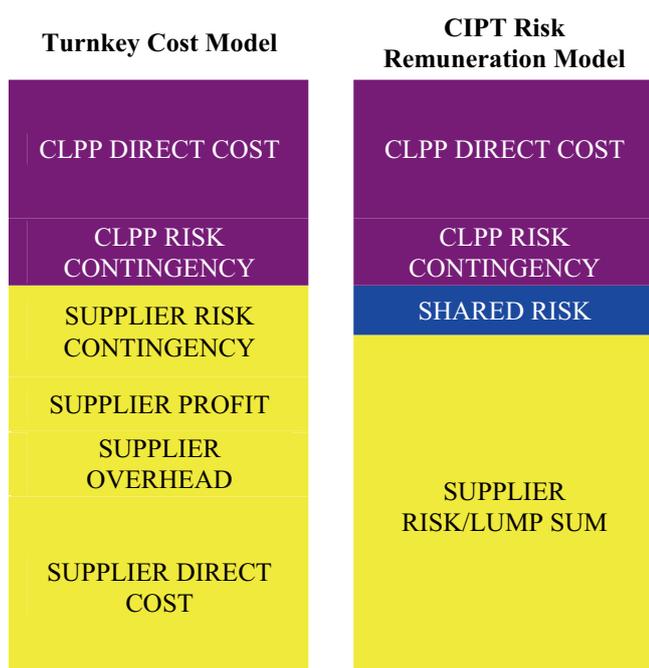


Fig. 4. Comparison of Traditional Turnkey & CIPT Cost Model

long, approximately 30 weeks, since it included not just the normal clarification process but also necessitated an alignment of civil and electrical solution contractors, a necessary process to allow the Tri-Party arrangement to be realised.

Following this process CLPP issued Phase 1 Outline Agreements to Hip Hing and Xian Electric. This agreement enabled Hip Hing & Xian Electric to commence the Phase 1 (Design) Works. Phase 1 is an integral part of the CIPT process that permits advanced integration design work to take place between the three major stakeholders and before final project commitments are made. This enables further optimization and alignment to occur before releasing the project for full implementation.

12 weeks of intensive Collaborative Integrated Project Team effort enabled CLPP to issue the Final Agreements to Hip Hing and Xian Electric thus allowing Phase 2 (Implementation) to proceed. The period from the tender invitation to the Final Agreement was about 42 weeks.

When considered in its entirety this represented one of the longer periods from initial receipt of tender to final contract award that has been experienced by Hip Hing & Xian Electric. Although a direct comparison is not appropriate the overall time period during which the contractors must manage the tender process should be noted.

A formal debriefing was offered to all tender participants by CLPP in September 2005. Although not specific to the CIPT process this did offer Hip Hing, Xian Electric and the other tender participants the opportunity to better understand the strengths and improvement areas in their submitted proposals. This enabled all to better understand their proposals in terms of the CLPP measured parameters of Technical Proposal, Price and CIPT Relationship (Capability & Willingness).

The Phase 1 element has provided the opportunity to progress works in an

integrated manner. Although still part of the procurement process it offered all parties the means to work together in a more open environment. This enabled further sustainable improvements including more use of prefabrication, increased use of natural ventilation & lightings, the employment of more self-cleaning external finishing and the greater use of energy saving and energy efficient equipment.

In conclusion this CIPT tendering process is a balanced procurement approach considering value rather than price. Value added factors including the measures of the CIPT relationship (Capability and Willingness) play an important role in the evaluation process. It is in line with the Government of HKSAR, ETWB, Technical Circular (Works) No. 8/2004 for "Tender Evaluation of Works Contracts for Public Works Tender". This encourages Hip Hing and Xian Electric to aim for continuous improvement for better performance in CLPP projects and proactive participation in the CIPT process with top management support and appreciation.

B. Construction Project Management

Construction project organizations are often referred to as temporary multi-organizations (Cherns and Bryant, 1984). Although the project goal was established through the signing of a Project Charter, such temporary organizational membership, in the form of the CIPT in this case, may affect the individual's perceived extent of goal commitment. The organizational structure of CIPT matches well with Walker's (2002) suggested classification of the project management system: managing sub-system (PLT), control sub-system (PMT), and operating subsystem (WIPT). A lot of working meetings were held at the WIPT level to finalize the design aspects of the committed substation projects and monthly meetings were held among PMT members to review the progress of the project and the implementation of CIPT ideas. So far, two PLT meetings have been held. Compared with traditional contracts, more meetings are conducted

under the CIPT model. Communication among WIPT members has been improved and the early identification and agreement on interfaces among CLPP, Hip Hing and Xian are also achieved. However the communication behavior to maintain open communication and mutual understanding in a cooperative working environment is challenging and shows little change to date. The adversarial attitude between client and contractor commonly found in the Hong Kong construction industry remains. While collaboration often suppresses any latent adversarial behavior when solutions have a clear short term win/win outcome, the adversarial trait becomes more visible when more difficult challenges arise. This is particularly evident when problems involve money threatening stakeholder cornerstones of budget and profit. However, there is clear, significant and improved change in communication behavior among PMT members, whose sense of mutual co-operation, shared risk and benefit is much higher than the WIPT members. This is probably attributable in part to the roles and responsibilities of the PMT being focused more upon overall project performance and therefore more easily aligned with CIPT principles. The WIPT often have to manage short term issues in which the characteristics of mutual benefit and common goals are more difficult to identify.

The project is basically a design and build contract and problems will inevitably arise where there is any perceived lack of clarity, ambiguities or any grey areas in the employer's requirements. There is plenty of scope for disagreement, particularly if the costs are significant. The CIPT model does foster stakeholders to develop a proactive attitude to resolve any disagreement.

The ultimate goal of the CIPT model is to increase profits and benefits for CLPP, Hip Hing, Xian Electric and the communities we each serve by working together rather than against each other. Since the project is progressing it is too early to quantitatively evaluate the

benefits gained. However, there is no doubt that the senior management of CLPP, Hip Hing and Xian Electric believe that under CIPT each party co-operates to achieve predefined goals as depicted in the Project Charter. One of the keys to the success of the CIPT approach is the WIPT and the ability of this group to bring their extensive technical and commercial experience and expertise together to focus on one clear and common set of project goals. However, their behavior is largely affected by the organization to which they belong. According to Bozeman and Rainey (1998), the features of bureaucracy are: (1) hierarchy, (2) specialization, (3) approvals needed to perform a task, (4) written rules and procedures, and (5) record keeping. Alignment of organizations, organizational procedures, rules and the principles of the CIPT Project Charter will be an important factor in the development of this approach. The more aligned these can become between the three parties, the easier it will be to develop the CIPT approach.

Summary & Conclusions

Success to date has been achieved with the initial switchboard replacement projects being delivered on time and on budget despite the high risk normally associated with this type of in-situ replacement. Importantly CLP Power's success has been achieved by true Win/Win/Win with all parties benefiting from the projects high performance, zero impact to system security, very substantial capital expenditure and time saving, negligible construction waste and consumption of new resources as compared to an equivalent "green field switchboard replacement" and with the public being largely unaware and unaffected by the major construction being undertaken. It is too early to measure CIPT success on the follow up Transmission Substation Projects but the clear commitment by the three major stakeholders together with a recognition of the challenges ahead have established a firm foundation.

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Biographies



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