ALTERNATIVE CONTRACTING AND DELIVERY METHODS

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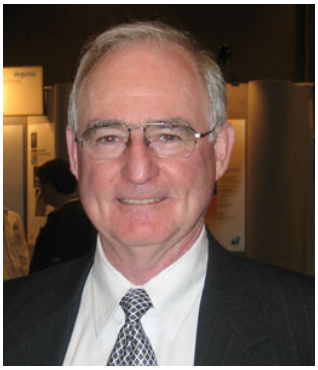
Introduction



Establishing processes for clear definition of risk and risk sharing with the successful contractor and working in a collaborative contractual environment was one objective of a report on alternative contracting methods prepared in 2008 for the legislature of Washington State in the United States. The report was sponsored by former State Secretary of Transportation, Doug MacDonald. Key elements of that report had relevance to the proposed large diameter bored tunnel replacement of the Alaskan Way highway viaduct project in Seattle. Following review of that report by Program Director Linea Laird several key recommendations were implemented.

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ARTICLE

Traditional methods of project procurement have remained virtually unchanged in the US infrastructure construction industry for more than 50 years. Up until the 1980s methods of project procurement and administration in many countries were similar with public agencies retaining tight control over the design and construction of projects. Serious drawbacks associated with traditional methods led to consideration of alternatives and by the late 1980s 'Alternative' methods became primary contracting methodologies for many major projects in the UK, Europe, Asia and Australia with significant changes for underground and tunneling projects.

European agencies in particular appeared to be better at attempting to capture the efficiencies and resources that the private sector offered, through the use of innovative financing, alternative contracting techniques, design-build, concessions, performance contracting, and active asset management. These methods generally worked to create a better team approach and to establish an atmosphere of trust - leading to increased innovation in order to add value and to allocate risk more appropriately (Chambley et. al., 2000).

Many of these methods were reported to increase efficiency and add value through optimized work processes and increased innovation (FHWA 2002; AASHTO 2005). As a result, in October 2004, the US Federal Highway Administration (FHWA) initiated SEP-15, an experimental program to allow contracting agencies to explore alternative and innovative approaches to the overall project development process, focusing specifically on applications with public-private partnerships. SEP-15 can form the basis of a new contractual approach such as general contractor construction manager (GCCM) or Alliancing, particularly if public-private partnerships are involved.

TRADITIONAL CONTRACTING METHODS

Design-bid-build (DBB)

DBB is the most basic US contracting approach, and works best where there is clarity of deliverables with a low probability of major risk or encountering the sort of uncertainty, which will cause significantly changed conditions. Intended to create a clear and objective competitive environment, avoid problems of influence, collusion, corruption and/or bid-rigging, The intent is to provide taxpayers with the project 'at the lowest price that responsible, competitive bidders can offer'.

The following concerns have been raised with DBB:

- It is time consuming when savings of time might be achieved by concurrent organization of early phases of design with phases of construction.
- Pressures resulting from the low-bid environment have resulted in substantial cost and schedule increases leading to claims, disputes and costly litigation.
- In order not to convey 'unfair' advantage to one construction contractor, the design work is typically performed without contractor input - therefore opportunity is lost for the construction contractor to shape and contribute to the design - with practical suggestions and use of construction methods that can add value.
- The contractor's non-involvement in the design contributes to the adversarial nature of the construction process.
- Additionally in DBB (as in DB) there is an inherent conflict embodied in the contractual provisions - as described in Quick's paper on Relationship Contracting (Quick 2002), and as noted following.

Design-build (DB)

Not all DB projects have been successful. One difficulty is in estimating the final cost prior to inviting proposals. Normally, in DBB, cost estimates are done with design engineering 100% complete, just prior to soliciting for bids.

In DB that solicitation is done with design engineering between 10 and 30% complete, making the estimating much more uncertain. However, even though the project cost is contractually fixed at 10-30% design completion, there are reports that there is less cost growth than that which often occurs between 30% design and final bidding documents on a traditional DBB project (Warne & Schmitt, 2005).

Another difficulty reported is that a design-builder will build what is required, but not necessarily what is desired. In DBB, the public agency can, and does, modify design to include desirable changes right up to the time of bid, with the ability to incorporate input on functional and aesthetic elements and other 'should do' items. With DB, if the contract documents do not specifically require something, it will probably not be supplied.

Low-bid requirement

The general assumption that the 'low-bid' by the 'lowest responsible bidder' results in best value and lowest cost is seriously open to question.

Consider that each party enters a contract at their own risk and the contractual environment is characterized by the ability of each party to treat the other party as an adversary - for their gain at the potential expense of the other. To be the 'low bidder', the contractor must do at least two things:

1. Determine his lowest cost to deliver the work specified at a minimum quality level.
2. Determine a strategy to bid that cost - or lower - to secure the work, with the expectation that any deficiencies in price can be made up in changes caused by new agency requirements, changed site or environmental conditions, defects in the design documents or other strategies that will accrue to his advantage.

This potential conflict in contract management and execution is exacerbated by such problems as:

- Interpretation of the contract - i.e. how are terms interpreted - do they mean that the Owner (or the contractor) must bear a certain risk? How is that known during the bidding phase? And therefore how can it be clearly priced?
- How do contract terms deal with an event or consequence that has arisen from performance of the agency or contractor? Who is responsible for a breach of those terms? What did the parties really agree to - and how can this be priced or resolved during construction under a dispute?
- Risk events that may occur and how they are treated under the terms of the contract - i.e. who has agreed to bear those significant (and usually unknown) risks? How can this be anticipated?

PROMISING CONTRACTING ALTERNATIVES

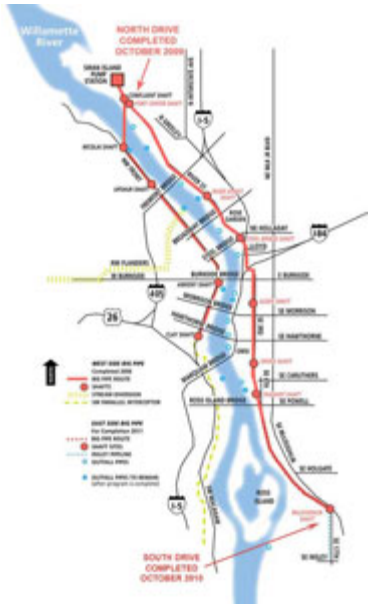
General contractor/construction manager (GCCM)

Also known as CM/GC, and sometimes Construction Manager at Risk, this is a procurement method in which a general contractor is engaged to work with the Owner and designer to develop and deliver the project. This contractor may not construct all elements of the project but is responsible for delivery of the project at a guaranteed maximum price ('at risk').

The estimated cost for the work is developed by the contractor and options to reduce cost, increase value or shorten schedule are evaluated with the Owner, after which the contractor submits a Guaranteed Maximum Allowable Construction Cost (GMACC), which the Owner can accept or reject, minus any scope changes made by the owner.

An example of GCCM for complex tunneling and underground construction is the Portland, Oregon, Combined Sewer Overflow (CSO) program and Portland Tri-Met Light Rail extension to the Portland Airport.

The City of Portland wanted to avoid the adversarial nature and the disputes, claims and litigation it had experienced in previous conventional DBB contracts. It needed participants to focus on solving problems constructively and not waste time in adversarial contractual (claims) management, or posturing for litigation. The form of contract was open book cost reimbursement plus fixed fee to cover contractor overheads and profit. Fee was paid commensurate with percent complete of work. Risk Mitigation for identified risks was included in the project. For risks that could not be mitigated, a $17 million contingency was



Portland CSO project

recommended for the West Side CSO Project and accepted by the City Council (the contract was for $293 million). Benefits noted by the owner included:

- Having the contractor on board during the design provided valuable input on construction, innovation suggestions, and permitted contractor buy-in to the design and construction contract.
- Changes were handled quickly and in the best interests of the job - no major paperwork or delay for changes, no claims. Contract did not recognize Type I differing site conditions for the prime contractor since direct costs were paid as reimbursable. Only Type 2 differing site conditions could increase fee if they impacted the critical path. In general, there was no markup on extra work, unless it was due to Owner direction and affected the critical path.
- Owner and contractor did not have to 'take a position' or be adversarial, so they could resolve issues in the best interest of the project, which meant better objectivity and team alignment.
- Owner was directly involved on site, understood the work, and could staff the work appropriately.
- Bi-annual audits were carried out. Audit findings were very complementary.
- The time taken for decision-making was optimized.

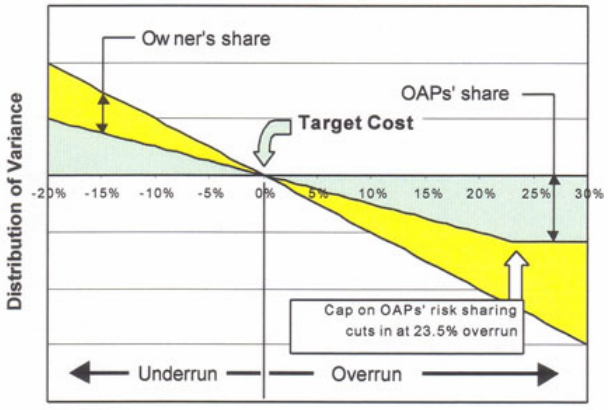
The use of specific incentive/ disincentive provisions was not used in this contract - this is currently being considered by other Owners.

Alliancing or relationship contracting

Alliancing requires that the Owner, designers, contractors and suppliers work together as a single team, with contractually defined risk-reward (pain-gain) provisions to meet or better define target cost. The Owner(s) and the service providers (engineers, contractors) collectively assume responsibility for delivering the project against pre-agreed target performance outcomes. The first Alliance projects are reputedly the British Petroleum Hyde and Andrew Projects, oil and gas platforms constructed in the early 1990s (NCE, 2000).

The team is selected based on a determination of which is best to design and construct the project (but before a price is determined). The Alliance contractual agreement is executed after team selection. The team of Owner, engineer and contractor develop the target cost estimate and schedule, which is independently verified as reasonable, and then proceed to design and construct the project. An important part of Alliancing is that the result of all outcomes - risks and benefits - is shared based upon the Alliance agreement: there are no claims for delays or litigation within the Alliance. All work is open-book and the team selects the best person for each position, regardless of affiliation. Also called, or related to, Relationship Contracting (Quick 2002) and similar to Early Contractor Involvement in the UK (British Highways Agency, 2004). Characteristics include:

- Parties are bound by one, relatively brief, agreement focused on the prime goals of the procurement
- The owner, in some form, is contractually part of the Alliance team
- Obligations are stated collectively in a 'We shall approach'
- Costs are 100% reimbursed
- Share in profit or loss is related to meeting defined performance goals in the pain-gain structure
- Overhead and fee are negotiated and fixed
- Losses can be taken out of fee and overhead but not costs
- Express commitment to resolve issues within the alliance without undue reliance on outside parties - no disputes or litigation within the Alliance



Alliancing, target cost pain-gain

- 100% open-book accounting for all parties, which requires trust and commitment
- Decisions of the Alliance Board are binding and must be unanimous
- Project is managed by an integrated management team, members are chosen on the basis of 'best person for the responsibility' from any of the Alliance partners.
- Participants develop and commit to the Alliance Principles, focused on key project goals

Benefits were reported from infrastructure projects such as the Sydney Northside Tunnel Project (Henderson, 1999) and the UK Channel Tunnel Rail Link (Arnold & Myers, 2000).

Significant benefits reported (Evans & Peck, 2003; Key 2004) for the Australian projects included reduced cost, added value, improved schedule, higher levels of innovation, reduced or eliminated adversarial environment and the practical elimination of disputes, claims and litigation between owner, designer and contractor (Quick, 2002). Of note, the preface of the Victoria 'Project Alliancing Practitioner's Guide' (Victoria Treasury, 2006) states: 'Alliancing is about providing better value for money and improved project outcomes through a more integrated approach between the public and private sectors in the delivery of infrastructure projects. Alliancing reflects a shift from more traditional procurement methods, which focus on strict risk allocations, to a collaborative approach. This involves Government working with one or more service providers to align incentives and objectives, and manage project risks and issues.'

Real results from global projects

The first of the Alliance projects, the North Sea offshore oil and gas platforms BP Hyde and BP Andrew Projects, were constructed in the early 1990s. Results reported for these platforms were:

- £450m first estimate
- £370m sanction to proceed
- £290m cost (22% savings)
- Completed 6 months ahead of schedule

British Petroleum was an early user of Alliance contracting

In total, four UK offshore oil platforms aggregated savings of £550 million or 20% (NCE, 2000).

In Queensland the Port of Brisbane Motorway Alliance established a Target Cost Estimate (TCE) of Aust$112 million, representing a 30% probability cost outcome.

The final result was a saving of Aust$8.3 million or 7.5% less than the TCE - even including an increase of scope of approximately Aust$7 million, representing a total saving of Aust$15.3 million or 13.6% (Evans & Peck, 2003). The report notes additional value obtained through innovation, better design options and outcomes, better aesthetics, better 'fit for purpose', better quality of workmanship and, a focus on innovation and improvement rather than pursuit of claims.

The UK Channel Tunnel Rail Link project reported results better than established targets for safety - 18% better; process defects 45% better; waste management 75% better; complaints 63% better; staff costs 26% better; and a five month reduction in schedule (Halcrow, 2005).

UK Channel Tunnel Rail Link succeeds with Alliance method

From a survey and comparison of its 48 Alliance projects, Sydney Water found that:

- 61% of Alliance projects exceeded expectations versus 17% of non-Alliance projects,
- 72% of Alliance projects achieved lower cost than initial target/budget,
- 36% of Alliance projects were ahead of schedule compared with 10% for non-Alliance projects.
- The best Alliance was 35% ahead of schedule while the best non-Alliance was 10%.

Sydney Water reported an analysis for the Northside Tunnel Project (Evans & Peck, 2004) that compared the independent Target Cost Estimate (TCE) to the projected cost for design and construction using a non-Alliance process, including the costs under that method for delays and scope changes actually experienced by the project. They concluded that the cost profile was, in summary:

- Target outcome Aust$451 million
- Final cost Aust$466 million (+3.3%)
- Design and construct estimate Aust$483-$507 million (20% and 80% ranges)
- Design and construct at completion Aust$567-$573 million (20% and 80% ranges)

This is an actual cost of Aust$466 million for the Alliance and a probable cost (50% range) of Aust$571 million if using design and construct - a difference of Aust$105 million saved by Alliancing (22%). This analysis is retrospective and not absolute, however, even if the assumptions are overly optimistic for Alliancing and pessimistic for design and construct, the fundamental conclusion is that the Alliance process delivered significant value in these circumstances.

Use of Alliancing is in many cases limited by governing legislation. This is more so the case in the US and for public works projects. Because the Alliance agreement includes the Owner, designer and contractor working together concerns have been expressed about the lack of a contractual 'arms-length' determination of cost and cost changes. Current legislation in the US generally requires a fully-independent 'low-bid' or 'best value' determination. Alliancing therefore requires an independent validation of the contractual target cost, since it establishes the target cost only after selection of the contractor. The cost of setting up the Alliance is also a factor. This is more efficient for larger projects and needs to be balanced against the potential benefits.

Implementation of Alliancing in Australia was facilitated by a very corrosive disputes, claims and litigation environment in the mid 1990s. There was a readiness to consider the new approach that proved able to deliver increased value to both Owners and contractors.

Use of innovative, more collaborative, contracting methods such as Alliancing or GCCM has the potential to deliver better value to Owners for complex underground projects.

It may be possible to use the key attributes of Alliancing and/or GCCM in current DBB and DB contractual environments and under existing legislative provisions and policy guidelines.

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