Container crane procurement: how to avoid the high cost of failure*

The container industry is about 40 years old. For the first 15 to 20 years most cranes were purchased by ordering a standard model from one of a handful of manufacturers based in the US and Europe. Since then, industry practice has changed and today there are more and more "custom" crane designs, being built by a growing number of manufacturers.

Low price is the entry ticket for inexperienced manufacturers and customers generally get what would be expected as a result: low capital cost, marginal performance levels and high life-cycle costs. This practice is unhealthy and conditions are worsening.

Many purchases are less than perfect but still deemed acceptable. More disturbing is the growing number of "high profile" jobs that go sour and which now outnumber the projects which can truly be called successful.

Ironically, the ports where these failures occur sometimes have excellent records when it comes to civil construction projects, based on good policies and training standards. But when it comes to cranes they turn everything over to someone else and let him violate all the rules.

Familiar patterns

A critique of past projects reveals patterns that, on average, greatly alter the odds of success or failure. This is especially true of some high profile failures that are characterised by huge cost overruns, deliveries months or years late, or completely unsatisfactory crane performance and durability. All these high profile failures have in common one or more of the following pitfalls.

- Lack of effective owner's project management (OPM). More than any other factor, OPM is the key to success. Effective OPM starts with top management, specifically the person who controls the purse strings and has the authority to decide which path to follow when a truly serious problem arises.

Day to day OPM should be conducted by a professional manager with a proven track record.

**This article, by Bill Casper of Tacoma-based crane consultants Casper, Phillips & Associates, is based on his recent presentation to a US port which is in the market for up to 12 superpost-Panamax container cranes*

OPM specialists are rare. It should not be assumed that an outstanding specialist in another field has the necessary skills to be an effective owner's project manager.

- Lack of proper technical expertise. With, unfortunately, relatively few exceptions, manufacturers are less technically qualified to produce high quality engineering for custom designs. Bright young engineers are generally no longer attracted to heavy industry. Computer science and other high-tech fields get the cream.

Fading away?

Older engineers seldom keep up with the computer design aids that today are needed to produce high quality engineering. They still have sound engineering judgment based on years of experience but that skill is going away with retirements. In many countries retirement is mandatory at age 60 or sooner.

Crane consultants can still attract bright young engineers as well as offer the mature engineering skills and practical experience needed for guidance and training. Consultants can work either for the owner or the manufacturer.

Each has potential advantages and disadvantages for the owner. Working for the owner means more loyalty to the owner's best interest but the consultant's role is peer review rather than design leader. The inverse is true if the consultant is working for the manufacturer.

- Lack of effective manufacturer's project management. This is a major pitfall. Common practice is to award contracts with no participation from the individual who will manage the design and construction. Big mistake!
- Lack of appropriate construction oversight. This is the area that most affects life-cycle costs, productivity and durability. Common practice is to rely on the manufacturer's QA/QC supplemented by a low budget owner's representative. This practice has been used many times and has consistently produced poor results. With increasing pressure to cut corners, the situation will get worse.

Complex structures

Cranes are not just structural steel. They are a complex system of electrical, mechanical and structural components. No one individual can have expertise in all these specialties, especially when maintenance expertise as well as design and construction expertise are included. Effective QA/QC oversight is costly. Lack of oversight is, long term, far more costly.

- Overly aggressive delivery schedule. Studies have been made on the effect that schedule has on cost, quality and actual delivery time. Overly aggressive schedules are counter-productive and the same is true of overly liberal schedules. This is a prime example of where top level OPM can most influence success or failure.
- Inadequate commercial protection. Foreign construction is unlike normal domestic construction in that the conventional performance bond is essentially worthless. If the contractor defaults, or even threatens to default, the bonding company first will not want to help and second cannot offer much help once they are forced to respond.

Time out

There is always a time factor that precludes starting over with another design/build contractor. True, the bonding company may eventually provide replacement cranes but only after years of litigation, redesign and construction. Even then, there is the possibility of another default.

Liquidated damages may or may not be collectable. Some laws permit charging only for actual damages. Others require that a bonus is offered to balance the liquidated damages. Only a few strongly protect the owner's right to collect liquidated damages.

However, that assumes the foreign contractor is willing to pay or that the owner has possession of the goods and enough retention to cover the assessed damages. Some foreign manufacturers simply refuse to accept liquidated damages and, regardless of contract terms, will withhold shipment until the terms have been changed.

In summary, it should not be assumed that a performance bond will provide protection unless the contract is with a domestic manufacturer. There are better ways to protect the owner's interests that are not overly expensive and give much better protection.

What's do be done?

For the full duration of the project, top-level management participation must be maintained on policy issues and on the relatively few serious problems that will surely arise from time to time. Crane procurement must be managed like any other major construction job except for complications of design/build format and foreign rather than local construction.

Well qualified consultants should be used as advisors. When conflicts arise both sides should be listened to and the best choice then selected for the owner. That choice may or may not agree with the consultant's advice.

Comprehensive tender documents should be prepared that, clearly and without ambiguity, define the required crane system. These tender documents should be trusted and, if well enforced, will give adequate assurance of the contractor's performance. Doing this means the contract can be awarded to the lowest responsive bidder or the bidder deemed to offer lowest total cost after QA/QC costs have been factored in.

Schedules

A reasonable schedule should be followed. Common practice is to take an excessive amount of time in the pre-award phase and then squeeze the design and construction phases. This practice produces higher costs and more blunders during the design and construction phases.

When an aggressive schedule is essential, remember the adage: "fast, cheap, good—pick any two." We can add another. Fast and bad management usually results in: "slow, not good and probably not cheap"– a characteristic of most of the recent high profile failures.

Approval rights over the selection of the contractor's project manager should be retained. This person should attend all commercial and technical meetings prior to and after contract award.

The right team

A fully qualified team for day-to-day project management and QA/QC oversight should be assembled. This is costly but that cost will be repaid several times in reduced life-cycle costs. The budget for this effort should be a reasonable percentage of the total purchase cost. Obviously a large order for, say, 10-12 cranes justifies a much higher "oversight" budget than a single crane order. ❑

A crane is either a commodity or an engineered product. The mistake is to think you can get the latter by paying a commodity price