

Crane Purchase Specifications: Tailor-Made or Off-The-Shelf?

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Overview

You are operating a small-to-medium size container terminal and need to purchase one or two new quay cranes. You have one or two older cranes and you maintain them with your in-house staff. These cranes were purchased many years ago in a climate very different from now and you have limited expertise in purchasing new cranes. What do you do? Should you purchase the cranes like you purchased your yard chassis and other equipment from an established supplier or should you venture into the new world of comparison shopping?

This paper will outline the evolution of the container crane industry, explain the current crane purchase environment and different purchasing strategies, and provide two case studies.

Evolution of Container Crane Industry

There was a time when a container crane purchaser could call up a Paceco representative in any part of the world and order quay cranes. Paceco pioneered container cranes and built the world's first quay crane for Matson in 1958. The cranes supplied by Paceco and its licensees had a rail gage of either 50' or 100', with some exceptions, and standard capacity, outreach, backreach, and lift heights. They produced good quality cranes and stood behind their product.

European container crane manufacturers entered the market, improved the product, and matched Paceco's quality and price. The purchaser's life remained unchanged. He could still purchase cranes with little anxiety and effort, and he was still offered the standard products.

The Japanese entry into the container crane industry in the late 60s presented some opportunities and, for the first time, some challenges for the purchasers. Japanese consumer and industrial products were introduced to the world market at significantly lower prices; the container crane industry was no different. The first reaction within the Western world was, No such thing as a free lunch—you will pay for it one way or another. However, some large shipping lines saw opportunity in the new competition and decided to give the Japanese a try. Then the purchaser's life became interesting. How would he ensure good quality if he bought Japanese cranes? One possible way was to issue detailed technical specifications and do a thorough audit of the design and manufacturing. We all know Japanese are committed to quality and that they provided good quality cranes. Within a short time, they were in the same category as the Americans and Europeans. With the economy growing and domestic demand



World's First
Quay Container Crane
Built by Paceco in 1958

increasing, Japanese cranes ceased to be a bargain. The concept of purchasing cranes with the “Tailor-Made” specification had begun.

Korean crane manufacturers and others were next with the lower-priced cranes. Now it is the Chinese who have made the most significant impact on the container crane industry. It is well known that ZPMC, a Chinese container crane supplier, has the dominant share of the world market and may further increase its share over the coming years.

Crane Purchase Environment

Both the privatization of the ports around the world and ZPMC's success have created an extremely competitive environment for the container crane manufacturing industry. Consolidation of shipping lines and terminal operators and increase in ship sizes have created a need for larger, faster, and smarter cranes. The crane industry has responded well to this demand. However, crane prices, when adjusted for inflation, have remained stable or even come down. This has been the best of times for crane purchasers.

The gain for crane purchasers has meant difficult times for manufacturers. Paceco could no longer compete with the overseas suppliers, even after moving manufacturing to a lower-cost region of the U.S. Some European suppliers have merged or quit manufacturing quay cranes. The Japanese suppliers retracted from the international market and remained focused on their protected domestic market. Those remaining active in the market have made some significant changes to the way they do business. And this is where some of the crane purchasers need to be wary.

To compete in the current market, established crane builders have shifted fabrication and assembly to remote plants with cheaper labor, sub-contracted fabrication and assembly to regions with cheaper labor, purchased electrical components and integrated them in-house, standardized components, and, of course, reduced profit margins or sold below cost. Some manufacturers have maintained their quality throughout these changes, while others have encountered serious problems. The latter have caused their purchasers significant delays, equipment downtime, and reliability problems.

Quality vs. Price

The current environment has created a lot of uncertainty and anxiety among crane purchasers. The purchasers feel that they could still order quality cranes at a high price but find it hard to justify the high price when they hear about the cranes someone else bought at a very low price. What can the purchasers do?



ZPMC cranes for
Oakland, California



Noell cranes fabricated in Abu Dhabi for
APL Los Angeles

Procurement Strategy

The small terminal purchaser has the option of purchasing cranes with what we will call an “Off-the-Shelf” design or with competitive bids with a detailed performance specification we will call “Tailor-Made.” Frequently, the process is a hybrid of the two. In either case, the modern day purchaser needs to be better informed and more diligent than before. The crane procurement process is no longer a matter of ordering a crane from a local representative. In terms of price and flexibility, however, the purchaser is better off today.

The choice of purchasing strategy would depend on the number of cranes, location, requirements, and in-house expertise. A larger number of cranes brings economy of scale and favors Tailor-Made. Asian contractors tend to be more competitive on the west coast of the US than European contractors, and vice versa on the east coast, strictly due to the difference in transportation costs. Due to the current crane market, some crane suppliers are not able to provide custom features and still be competitive. Off-the-Shelf process favors standardized designs. Tailor-Made cranes require high expertise, whether in-house or through outside consultants.

Off-the-Shelf

The intent of this strategy is to emulate the early purchasing strategy of issuing a brief technical outline and inviting proposals from two or three crane suppliers. However, the modern day purchaser needs to do some homework and be more specific than his early counterpart. The proposed strategy is likely to provide good quality cranes without the extensive procurement process, and at the same time encourage competition between the crane suppliers.

Homework

The purchaser requirements should be based on the anticipated crane usage, lift capacity, quay strength, available power, and vessel dimensions. The purchaser’s operations personnel should operate the suppliers’ prototypes. The purchaser should visit cranes from two to three suppliers that generally match his terminal requirements. The crane suppliers are generally happy to arrange for these tours and provide a copy of their technical specifications. The maintenance personnel should note the required maintenance and ease of access to the various maintenance locations, and they should review maintenance programs and reports, including structural maintenance programs. They should get feedback from the terminal and crane operators about the downtime and reliability of the cranes and solicit the changes they would like to see.

The purchaser should confirm with his observations the features of the major components and their manufacturers as listed in the technical specifications, and note changes. The major components are: drives and controls, motors, reducers, brakes, cable reel, festoon, and spreader.

Crane suppliers use various international design and manufacturing standards. These include FEM, BSI, DIN, JIS, AS. The most prevalent standard, FEM, is an excellent crane specification and provides for different crane and component classifications based on the anticipated usage. FEM wind stability factor, which is generally suitable for the European conditions, may not be adequate for other parts of the world. Many crane suppliers use the 1987 version of FEM, which requires a 1.1 stability factor against storm wind. The recent version has increased the factor to 1.2, although some of the crane suppliers have not adopted it.

The U.S. standards require a stability factor of 1.5. The purchaser is advised to seek help from the local building code experts.

The purchaser should also learn from the terminal operators about the procurement process and the manufacturing quality monitoring level used for the purchase of the prototype cranes.

Invite Proposals and Negotiate Purchase

The purchaser is now ready to send request-for-proposals (RFPs) to two or three crane suppliers. Each RFP should be specific to the supplier and include the supplier's specification for the crane at the terminal visited by the purchaser. The purchaser should state the specific requirements and desired changes. The purchaser should carefully evaluate each proposal and compare it with the RFP, keeping in mind that he is comparing apples and oranges. He is likely to find that some features and components are not common between the various proposals. He may need some clarifications from the suppliers.

Once satisfied about the technical contents of the proposals, the purchaser should then compare the commercial terms, including the cost of the monitoring effort. The cost of monitoring may vary among suppliers. The final selection will depend on a combination of the technical features, reliability, after-sales support, price, financing, and delivery.

Limitations

The Off-the-Shelf approach is suitable for purchasers from the private industry, since they can evaluate the proposals with different standards, and are not required to accept the lowest tender. The purchasers from the public agencies are generally required to follow standard assessment procedures and frequently required to accept the lowest tender.

Case Study – NYC EDC Red Hook Terminal – Two Cranes

NYC EDC financed and purchased two cranes for Red Hook Terminal in New York. The terminal operated by American Stevedoring Corp. is considered small-to-medium in size and has two older quay cranes. The terminal manager has a strong background in operating and maintaining container-handling equipment and was entrusted with the selection of two new quay cranes. He followed the above Off-the Shelf strategy and recommended the purchase of two quay cranes from Liebherr. NYC EDC contracted with Liebherr and retained Liftech to provide a cursory design review and manufacturing review. The cranes are being assembled and the purchase strategy appears to be successful.

Tailor-Made

Due to the nature of the current crane supply market, it is becoming increasingly difficult to make an educated comparison of the “apples and oranges” proposals from the different suppliers. The trend among the purchasers is to start with a Tailor-Made approach.

The Tailor-Made approach involves issuing a detailed crane performance specification, comparing proposals, making the necessary changes, selecting the supplier, and implementing a design and manufacturing monitoring program.

Specifications

The purchaser should start with a base line specification, either from an earlier purchase or from outside experts, and update it with the specific requirements. Starting from scratch is impractical and unnecessary.

The detailed specifications outline the crane geometry and speeds, preferred major components, special features, environmental conditions, permitted design standards for structural, mechanical, and electrical designs, manufacturing standards, required manuals, testing, and required spares and options. The specifications should require the suppliers to bid the specified cranes and permit them to provide an alternate bid if they choose to take exceptions to the specifications. Different suppliers have different preferences for the design standards and manufacturing practices. They should be permitted to maintain these to the extent they meet the general quality of the specified cranes. However, they should be asked to list the exceptions and explain the differences.

Bid Evaluation

It is important to make a thorough comparison of the technical parts of the different bids. It is highly unlikely that any bidder would completely comply with the specifications. They are encouraged to propose alternatives and take certain exceptions as mentioned above. It is important to understand proposed deviations and their impact on the operations, maintenance, reliability, safety, price, and delivery of the cranes. Some deviations may provide comparable cranes or equal quality, some may mean lower quality.

The cost of monitoring of the crane design and manufacturing should be a part of the price evaluation.

Monitoring

The monitoring process spans from the review of the construction documents to the acceptance of the cranes. The level of monitoring should be based on the level of comfort with the supplier. This depends on a number of issues, such as existing relationships: Has the purchaser worked with the manufacturer? Has the manufacturer worked with the subcontractors? Have the fabrication and erection teams worked together? Have the contractor's facilities been used for other prototype cranes?

The cost of monitoring will depend on the experience and quality control of the supplier. Generally, lower-priced contractors require higher monitoring costs and higher-priced contractors require lower costs.

Some purchasers have in-house expertise to evaluate the proposed designs; others retain outside experts. Some purchasers conduct their own manufacturing monitoring; others retain local inspection agencies and outside experts.

Limitations

The Tailor-Made strategy is suitable for purchasers from both private and public industry. It is widely used for larger (four or more) crane orders, and is also becoming increasingly popular and necessary for smaller orders. However, this strategy demands higher-level crane expertise, whether in-house or from outside.

Case Study – CeresCorp Company, Halifax Terminal – One Crane

Ceres Terminal Inc. and Amsterdam Port Authority recently purchased nine cranes using a detailed specification, the Tailor-Made approach, for the new container terminal in Amsterdam. CeresCorp used the Amsterdam crane specification as a baseline specification, modified it to suit the Halifax conditions, and issued it to four bidders. CeresCorp considered the monitoring costs, among other factors, for the various manufacturers, and awarded the contract to ZPMC, based on total cost and quality.

Monitoring Costs

The total monitoring cost for purchasing cranes with the Off-the-Shelf approach may range from 0.5% to 1.5% of the purchase price for two cranes. The comparable cost for the Tailor-Made approach varies from 2.5% to 5.0% for two cranes. The percentage cost for a larger order would be less, as part of the total cost is not related to the number of cranes.

Conclusion

The container crane industry has evolved into a highly competitive market, currently driven by the success of the Chinese manufacturer ZPMC. The purchasers are in the driver's seat, as cranes have become larger, faster, and smarter, while prices have remained stable. Some established crane manufacturers have stopped manufacturing cranes, and others have made significant changes to their product and operations to remain in business. This dynamic has changed the crane purchase methods from earlier times when the purchaser, armed with a two-page specification, could order a good quality crane from the established suppliers. For the medium sized orders, the trend is towards the Tailor-Made approach, including an increased level of quality monitoring effort.

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