

What technical and commercial issues should you consider when preparing a quotation? *Richard Krabbendam\** provides a practical example.

## PROJECT PLANNING

**T**o contribute to safety, which is the main purpose of these articles, every job should be well prepared, whether it is complex or not. Good preparation is also an essential requirement if you are to offer a reasonable quotation.

Take the particular case of a 58 metre long pipeline being installed across a canal. As discussed in last month's article, (*IC, September, 1994*), the Request for Quotation (RFQ) may be very clear or very vague. As this task is not especially complex, we can assume that the RFQ would be on the vague side, asking only for a lump sum price to install the pipe in a pre-dredged trench, as shown in Figure 1.

As the 10 tonne fibreglass pipe has an outside diameter of only 60 centimetres it will be very flexible. The main issue is therefore; how do you lift a long and flexible pipeline?

There are of course other methods of installing a water pipeline across a canal. Tunnelling under the canal and pushing the pipeline through is a common modern method, as is pipe jacking, but here we will consider the various aspects of the job when a crane is used.

### SITE VISIT

Before you can quote for the project you have to visit the site and sketch the area where you intend to position the crane and where the pipeline is to be installed. Measure as accurately as possible at what radius the pipeline will be lifted and at what final radius it will be placed in the trench. From the radii and the weight of the pipeline we can select the crane type.

It is not just the lifting radii that should be measured. As the crane will most likely be installed along the side of the canal, we must investigate the soil conditions on the bank as well as next to the sheet piled wall. The canal sides are not vertical, inclining into the water at a 45 degree angle, and the canal itself is around 30 metres wide and 3 metres deep.

Based on this site visit we can determine that the chosen crane is capable of being positioned near the canal, a decision based on the soil conditions near the bank as well as the

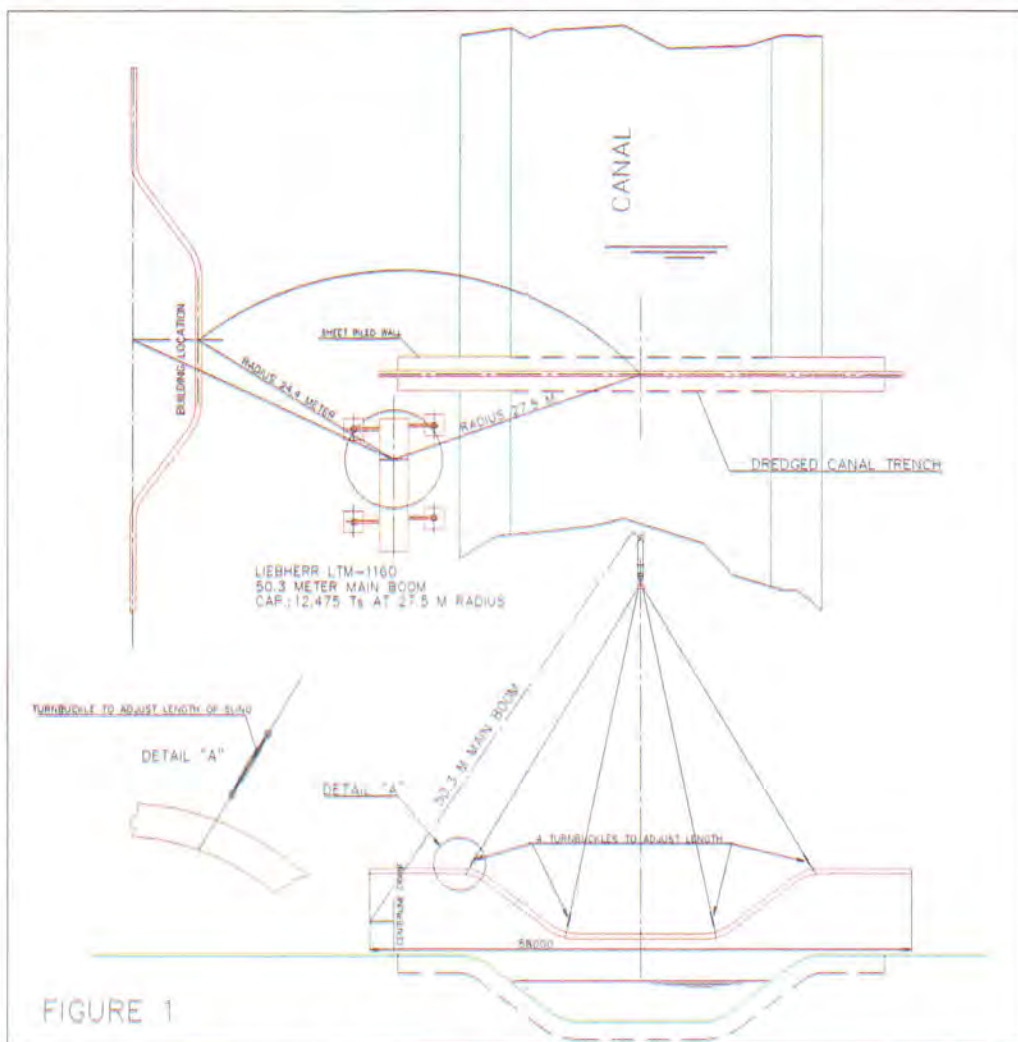


FIGURE 1

experience of the site surveyor. The safe approach is to position the crane outriggers a minimum distance from the canal bank top; say equivalent to the distance from bank top to the canal bottom. Wide load spreading mats are a necessity in any case.

How you would actually carry out the lift is described in the box story on the next page. First, however, you have to prepare a quotation, and win the job!

### PREPARING A QUOTE

When we have established the method of lifting and selected the right crane, we can prepare our quotation. This basically consists of:

- Lump sum price and rate structure if applicable.
- Description of scope of work.

- General conditions applicable to the job.
- Work schedule if applicable.
- Price of the job.

The commercial price at which the job can be offered depends on the following factors:

- Cost price of the job.
- Market price for such a job in that particular area.

It is obvious that the commercial price should at all times be higher than the cost price. The market price depends on the local circumstances, that is, the supply and demand for cranes. The cost price must be calculated by identifying each and every cost aspect of the job.

It is also clear that the quote should be at the highest possible price, as determined by



the market price and local competition.

In some cases you may decide to accept the job below cost price where other factors justify it. For example, it may be that the client has a lot of other work coming up soon and that you want to establish a business relationship with him. The best way to do this is to execute the job in a professional and safe way at a cost effective price. Well prepared competitive quotations, job execution plans, as well as professional job execution itself, are the route to success.

### COST PRICE

A good understanding of the cost price of the job is essential when preparing a quotation. The cost price comprises:

- Mobilisation/demobilisation cost of crane and rigging gear.
- Rental cost of crane and other equipment during project execution.
- Man hour cost.
- Miscellaneous costs.

The commercial rental rate of the crane is established on the one hand by the market rate



**A 58 metre long pipeline being lowered into a pre-prepared trench by a Demag TC-500 truck crane. Slings are attached to both ends of the pipe and to the middle.**

for that particular crane, and on the other by the hourly cost price of the crane. The hourly cost price is calculated by dividing the yearly cost of the crane by the total running hours per year.

The yearly crane costs consist of fixed and variable costs.

Fixed costs include:

- Depreciation cost of crane.
- Interest cost.
- Overhead cost.
- Operator cost.
- Insurance cost.
- Taxes to operate crane.

The variable cost is made up of:

- Fuel cost.
- Repair and maintenance cost.
- Cost of lifting gear.
- Tyres.
- Miscellaneous.

Again, it is obvious that the hourly cost price will reduce as the total number of hours worked in the year increases. Most of the fixed costs, such as interest, depreciation and overheads, remain the same whether the crane works or not. The other fixed costs, including operator, insurance and tax costs, might vary slightly (eg, overtime for operators).

### HOURLY COST

The variable costs will vary in proportion to the number of hours worked. However, since depreciation, interest and operator costs are the major cost determining factors of the yearly crane cost (and as they remain more or less the same), the hourly crane cost will be lower when the crane operates more work hours in a year.

The hourly cost price for a crane in the Netherlands is based on between 1,500 and 1,800 running hours per year. The hourly rate will vary depending on the country where the crane is operated, although the cost calculating principles remain the same.

If a crane is bought second hand at half the price of a new crane, then the financing cost (depreciation and interest) are less than for a new crane. However, repair and maintenance costs for a second hand machine will normally be higher.

A final thought. Although jobs should always be executed safely, there is a danger that if the price for the job is set too low, the crane contractor will be tempted to make short cuts to save costs. This does not encourage a safe approach.

## PIPELINE LIFT

**H**ow do you lift a long, flexible pipeline? The real question is; how do you lift it without causing buckling or bending?

First we have to lift it into vertical position, with both ends pointing upwards. To avoid buckling/bending, it is important to apply only vertical forces to the pipe (that is, perpendicular to its main plane) and spread them as much as possible along the length of the pipeline.

One way to do this would be to use a 35 metre long spreader beam. However, the beam itself would probably weigh almost as much as the pipe, thereby doubling the crane capacity required. A better method would be to use long slings and connect them to the pipeline at four positions or more, as shown in Figure 1.

The longer the lifting slings the smaller the compression force in the pipeline and the lower the risk of buckling.

First we lift the two end pieces while the pipeline rotates on the ground. When both ends are pointing upwards, the two (or more) remaining slings can be adjusted. To avoid bending the pipeline, we have to ensure that all lifting slings are the exact required length. Length can easily be adjusted with 3 tonne chain tackles or turnbuckles (as shown in Figure 1).

When watching the operation from a distance you can clearly see how much each sling should be adjusted. The crane lifts the load slowly until it takes the full weight. Final sling adjustments can then be made before the pipeline is slewed above the trench and across the canal.

In most cases, the crane contractor will not know the structural strength of the load, so it is advisable to submit a lifting plan to the main contractor to allow them to check the pipeline against buckling or bending.

When the pipeline is lowered into the trench a diver should disconnect the slings underwater and check how the pipeline is resting on the bottom. As most of the slings will be submerged it is advisable to use shackles and turnbuckles for length adjustment. They are less likely to be damaged by water than chain tackles.

**\* Richard Krabbendam is Vice-President of Jumbo Shipping Company's Special Transport Division. He has a Masters Degree in Mechanical Engineering from the Technical University of Delft and was project manager with Van Seumeren Holland until 1989. Before that he was managing director of Itrec BV Holland. He has been in the heavy lift and transportation industry since 1973.**

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