

White Paper 2023-11

Understanding the Impact of Forgetting Quantity Allowances When Buying Material for Industrial Projects

Recent PVD experience highlighted the need to remember that there is a substantial difference between the quantities that are produced by the designer and those that need to be procured by the project. It affects both the cost forecast and the efficiency of construction if insufficient quantities have been ordered. This White Paper reminds some basic rules about bulk quantities for industrial projects.

Various quantity allowances that need to be taken into account for bulk procurement

The net Material Take Off (MTO) produced by the designers is nowadays a simple download from the 3D model that states all the different quantities of materials from the catalogue that have been used in the facility design.

It needs to be complemented with various allowances to estimate the quantities to be procured:

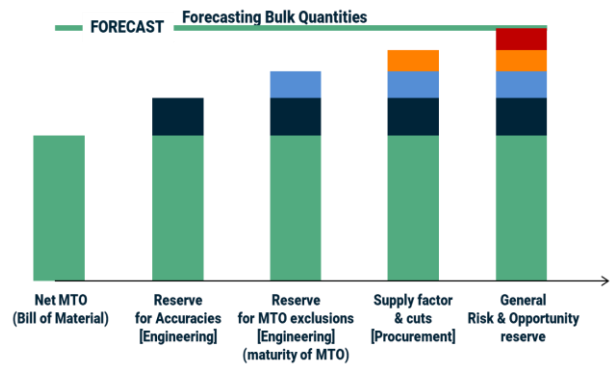
- Allowances driven by the design team to estimate the actual final quantities to be erected:
 - A design maturity allowance, that accounts for the design maturity level. As the design progresses towards more detail, quantities tend to increase in particular for smaller bulk items. This allowance will thus tend to decrease when design maturity increases,
 - A design exclusion allowance: generally, all details are not included in the 3D model and the design, as for example very small-bore piping for instrumentation etc. All excluded items and quantities need to be added on top of the net MTO from the 3D model,
- Allowances driven by the supply-chain and fabrication/ construction teams to estimate the additional quantities to be procured:
 - Allowances for nesting and cutting: material will be delivered in certain sizes, shapes and lengths. Depending on quantities it will not all be used, such as when cutting round shapes in square plates and cutting pipe length in standard 12m pipes. Fabrication facilities may be more or less effective and careful in using material, thus this allowance may depend on the fabrication facility and utilisation ratios based on previous projects must be used,
 - Allowances for logistics losses and damages: in particular for remote projects, some material may be lost or damaged along the way, or during storage, for various reasons and this needs to be accounted for to determine the material that needs to be bought. Some parts of this allowance may need to be specified by the construction

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team depending on security aspects of the construction site (pilfering).

- An allowance for cut-outs and repairs may be needed to account for welds or construction work not meeting acceptance standards and need to be cut out or repaired. The more difficult the acceptance criteria are to meet, higher the allowance for repairs and cut-outs. This allowance should be based on statistical analysis of past projects and specific fabrication or construction methods.

- General risks & opportunity allowances, to cover unexpected events that may impact project delivery and lead to loss or damage of material. They are based on a risk & opportunity analysis.



Allowance ratios are generally based on experience and mature organisations will have developed a set of standard ratios based on lessons learned. They then need to be adjusted to the circumstances of the project, in particular for supply-chain allowances.

Effect of inadequate estimation of quantity allowances

Inadequate estimation of quantity allowances can lead to either ordering insufficient, or excessive material. For the design related allowances, it may also affect weight control, which in certain instances is an essential parameter for infrastructure performance (floating infrastructure, modules that need to be heavy-lifted, seismic calculations etc).

We still sometimes (too often) find projects that completely forget to include allowances on top of the design software material quantities, which leads to lacking material when the project reaches 70-80% progress, with substantial consequences in terms of cost and reputation.

Insufficient material ordering may reduce project productivity when it should be at its peak and the full construction team is mobilised on site, creating substantial delays and costs. Should it affect long lead special bulk, it can create difficult situations that may require redesign with an inferior but more available material. In any case, this will result in significant consequential effect and should be avoided. A slight excess in material ordering should thus generally be sought with a return clause to suppliers of unused material in original condition. In addition, a detailed follow-up of actual material utilisation versus assumptions made on the various allowance parameters is also required to ensure that the initial allowances are adapted.

Excessive ordering of material will of course create significant additional direct cost, possibly increased wastage if the construction site does not make efficient use of material. It may also create a situation for the storage and disposal of the excess material, which may easily lead to inappropriate disposal streams.

In all cases, inadequate estimation of the quantities of material to be procured and installed will create substantial project impact and in certain instances may even jeopardise the final infrastructure performance.

Summary

Bulk material ordering is too often not taken sufficiently seriously in project planning, maybe because it looks less noble or urgent than complicated equipment

procurement. Still, inadequate quantities ordering may lead to significant consequences.

Allowance ratios are generally based on experience and mature organisations will have developed a set of standard ratios based on lessons learned

Projects must fully understand the difference between designed, erected and procured quantities and the ratios between those quantities to adequately forecast material cost and ensure that there is no stoppage of the project construction due to lack of material. Less mature organisations may lack precise allowance ratios based on experience or forget to apply those altogether, leading to situations with potentially very damaging consequential impacts, in particular when bulk material is missing while the construction team and the site are mobilised.

Read the Industrial Projects Practical Owner Guide

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