BILLING GUIDANCE PART 4:

Common Errors and omissions in billing : STRUCTURAL FABRICATION WORKS

Mistakes in fabrication bills are mostly the result of lack of check on specifications , error in understanding of contractual deliverables by client and the contractor , lack of inspection and testing procedures and absence of shop drawings. Examples are given below:

4.1 In structural fabrication following works are deemed to be included as part of fabrication and the work cannot be considered as complete if these are not carried out.

a. Grinding of cut ends of rolled sections and edges of gusset plates and slices.
b. Clamping long members in jigs to avoid their bending due to heat of welding.
c. Grinding of welded joints to remove the blur.
d. Temporary supports and hoisting arrangements and craneage needed for holding the member in position.
e. Bolting of all excess holes by correct size bolts.
f. If the members are curved in plan or elevation then such bending is to be carried out on CNC machines.
g. Shop drawings giving full fabrication details like sizes and dimensions of gussets and splices , mitring, bolt diameters and lengths and grade of steel, spacing between bolts, welding lengths , details of connections, hoisting provisions etc are supposed to be prepared by fabrication contractor for client's approval before fabrication.
h. A coat of red oxide or zinc chromate primer (referred to as a shop coat)
i. If epoxy paint is specified then sand blasting will be deemed to be part of fabrication if the fabrication contractor has to carry out epoxy painting .
j. Any additional fabrication or strengthening required for erection stresses.
k. Handling , loading , unloading and transportation to various workshops as may be needed .

4.2 The specifications need to be studied properly. The type of welding, type of steel (ie. hot rolled, cold rolled , high strength, etc are to be correctly identified. Different type of welding is required for different grades or types of steels. Yet different welding is required when two different grades or types of steel are welded together . In case of thick and high strength section preheating is required and hydrogen fillers have to be used to prevent hydrogen brittlement. In structural fabrication these are common things where you use different grades or weld hot rolled sections to cold rolled pipes. Due to such intricacies structural welding has to be done by certified welders only .

The thickness and dimensions need to be checked as these vary for standard rolled sections and rerolled sections. Verification of manufacturer's test certificate and original purchase invoice verification is absolutely essential.

Calculation of weight from lengths has to be on the basis of shop drawings and actual measurements as in most cases the lengths are much shorter than theoretical where number of members are welded to a gusset plate at joints. Check on thicknesses of plates, sheets , pipes and sections is an absolute must . A small reduction in thickness can make very significant difference in weight. Chequered plate thickness has to be measured in "no protrusion " area and vernier callipers have to be used for measuring thickness.

4.3 Following checks are necessary :

Whether site fabrication is permissible under the contract ? If so what about cost of electricity ?

If steel is client's supply what is permissible and actual wastage ? Is wastage returned to the client ? Does actual wastage + measured quantity reconcile with the total steel supplied ?

Are the welding lengths measured. Is the consumption of welding rods in accordance with measurement of weld lengths and type of welding rods used as specified ?

Does the contract or drawings require any specific tests such as radiology of welded joints to be carried out and if so have these test results been verified and approved ?

Have correct methods been used and correct tools applied ? Holes are drilled and not cut with gas ? All mitres cut with proper use of jigs ?

Have all contractual requirements for inspection and testing processes been complied with and properly documented ?

Structural fabrication is a highly skilled job and should never repeat never be entrusted to grill fabricators .