

Checklist	Remarks	Action (X)	
<p style="text-align: center;">Project System Audit Structural Steel Group</p> <p>Note: Not all items of the checklist shall be checked. It depends on the status of the work and whether it is the first, second or third audit.</p> <p>⊗ = EH&S related question</p> <p>1. Project Definition</p> <p>1.1 Is the Project Procedure and Execution Manual (PPEM) available? What is the status, issue and date?</p> <p>1.2 Does the PPEM properly describe the scope of work and services expected from your discipline to execute the work?</p> <p>1.3 Are the applicable governmental, local authorities design codes/ norms/rules/ standards design guides, listed in the PPEM?</p> <p>Are they available in the discipline group?</p> <p>1.4 Are Company/client, standards/norms/guides/ practices/procedures/forms and specifications, applicable and to be used by your discipline being listed in the PPEM?</p> <p>Are they available in your group?</p> <p>1.5 Are specific project (account) specifications and/or amendments applicable and to be used?.</p> <p>Are they listed in the PPEM? i.e.</p> <ul style="list-style-type: none"> • general design specification DS-1; • has the philosophy of concrete versus fire proofed supporting steel structure(s) been agreed upon? <p>1.6 Does the PPEM contain an instruction on how to handle project variations of the original scope of work regarding administration, approvals and distribution prior to be implemented?</p> <p>1.7 Is the spare part philosophy being spelled-out in the PPEM for the various account codes and components regarding your discipline items to be purchased? i.e.: spare bolts, nuts,</p>			
RB28027.doc	www.red-bag.com	SHEET 1 of 8	

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washers etc.		
<p>1.8 Is a preferred, or approved supplier's list being included in the PPEM for the structural items and components to be purchased, i.e. structural steel building-shelter, shed(s) components, not limited to possible required facilities?</p>		
<p>2. Engineering Technical</p>		
<p>2.1 How is it ensured, that equipment items and components, specifications and calculations are:</p> <ul style="list-style-type: none"> • performed in sequence of criticality? • coordinated with other disciplines concerned, where required? • supported by (preliminary) calculation results to prove the quality in accordance with the applicable design codes and governmental and/or local statutory requirements? 		
<p>2.2 How is it ensured that:</p> <ul style="list-style-type: none"> • basic equipment-pipe rack-building structural loading tables (space requirements) used by your discipline are provided by other disciplines and/or suppliers? • in-house and supplier design equipment - building sizing are properly routed and coordinated with other disciplines and supplier(s) involved? • final calculation documents, prepared by the selected suppliers are provided for comments and/or approval? • supplier documents are approved by the discipline engineer assigned on the project? 		
<p>2.3 Based on which issue of the plot plan(s) were detailed structural designs started?</p> <ul style="list-style-type: none"> • State issue no., date and status. 		
<p>2.4 Computer calculations:</p> <ul style="list-style-type: none"> • are client's software programs to be used? 		

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<ul style="list-style-type: none"> • if so, are they listed in the PPEM with issue number, date and status? • if not, have our programs been certified by the discipline manager? • have they been approved by the client? • if a design code is involved how is it verified, that the latest design code issue has been implemented in the program? 		
<p>2.5 Has the structural lead discipline engineer approved the materials specified, to be in accordance with the material as required by the applicable building code?</p>		
<p>2.6 Are job related internal instructions developed and used?</p> <p>Have all group members been provided with copies?</p>		
<p>2.7 Is it anticipated that non-routine calculation methods are to be applied?</p>		
<p>2.8 Does the structural engineer attend pre-award/bid clarification meetings?</p>		
<p>2.9 Has the structural group ensured that an inspection representative is present at pre-award/bid clarification meetings?</p> <p>If possible, a HO construction representative should be present as well, when field erection is involved.</p>		
<p>2.10 ☒ Has pre-assembly of steel work (at grade) been considered:</p> <ul style="list-style-type: none"> • for piperack frames? • for complicated steel structures? • for tall steel structures and equipment columns? 		
<p>2.11 ☒ Are the lengths over which fire proofing extends over steel members clearly shown on structural steel instruction drawings?</p>		
<p>2.12 ☒ Do we have clearly identified where handrailing needs to be interrupted to provide clearance for construction and/or maintenance requirements?</p>		

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<p>2.13 ⊗ If heavy or large equipment has to be installed inside a steel structure, or lowered down via several floors, have we considered the following:</p> <ul style="list-style-type: none"> • overall dimensions of equipment including manholes, manhole davits and bolts, transport provisions and lifting points on equipment? • positions of all nozzles during lowering down? • to show and note on instruction drawings, steelmembers which have to be installed "LATER"? • to check stability of structure where bracings have to be temporarily removed installed later? • to give special attention to beams located above equipment and periphery beams of floors to be designed to carry at least a portion of subject equipment? • equipment weights and parts thereof to be shown and noted on instruction drawings and not only in static calculations? 		
<p>2.14 ⊗ Have forces from pipe supports been incorporated in the design of the steel structure?</p>		
<p>2.15 ⊗ To what extent have we avoided torsion and over-turning moments on steelmembers by pipe support forces?</p>		
<p>2.16 If applicable, what provisions have been made for slim tower structures?</p>		
<p>2.17 ⊗ To what extent have (relief) valve access platforms been included in the design?</p>		
<p>2.18 ⊗ Have fireproofing quantities for steel structures been defined?</p>		
<p>3. Engineering General</p>		
<p>3.1 How has the discipline project file been organized?</p>		

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<p>3.2 Is a planning list available of all requisitions for Company designed structures - buildings and/or of supplier detailed ones?</p>		
<p>3.3 Are supplier drawings for e.g. package units with a possible impact on Company structural steel design available in the group?</p>		
<p>3.4 How are supplier documents and drawings routed: sequential or parallel?</p>		
<p>3.5 How is the status of checks of supplier drawings, against Company engineering documents and their (re-issues) documented?</p>		
<p>3.6 What is the frequency of receipt of new issues of the equipment list?</p> <p>When was the last (re)-issue received?</p> <p>State issue number, date and status.</p>		
<p>3.7 Are package units potentially affecting structural steel design provided in sufficient detail in the equipment list?</p>		
<p>4. Job Control</p>		
<p>4.1 Has the budget for the structural group been released?</p>		
<p>4.2 Was the structural group involved in preparing the estimate, planning and manpower curve in executing the scope of work and services required for the project?</p>		
<p>4.3 Has the Project Execution Control System (PEC) been prepared for the scope of work and services required and is it used for proper progress measurement?</p>		
<p>4.4 How much is the progress measured against the PEC summary for the structural group?</p> <p>State date.</p>		
<p>4.5 What efficiency is being reported?</p>		
<p>4.6 How does the final expected manhour requirement relate to the assigned manhour budget?</p>		

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<p>4.7 Are changes in the scope of work being processed in time.</p>		
<p>4.8 Are the PEC and scheduled manhours being adjusted based on the approved project variations?</p>		
<p>4.9 Does the lead structural engineer receive a copy of the weekly LDS print-out?</p>		
<p>4.10 Is there a regular coordination meeting with the project/ engineering management and other lead engineers, including planning and cost control?</p>		
<p>4.11 To what extent and by whom, are the planning, cost and engineering managers informed, when changes and/or slippages are encountered?</p>		
<p>4.12 Is the specification/requisition tracking report regularly updated?</p>		
<p>4.13 Is the lead engineer involved in capital expenditures review?</p>		
<p>4.14 What is currently the percentage of agency personnel on the job within the structural group?</p>		
<p>4.15 Are planned milestones met in time?</p>		
<p>4.16 On the planning list, how do the actual dates "for bids" and "for purchase" relate to the original schedule date? This to also include subcontracts.</p>		
<p>4.17 Have the authority requirements been established?</p> <p>which authorities are involved?</p> <p>which structural documents have to be submitted for approval and by whom?</p> <p>is sufficient time allowed for presentation and approval time?</p>		
<p>4.18 Are material quantities periodically checked against our estimates?</p> <p>How often are quantity trends tracked and do we make periodical forecasts?</p> <p>Is tracking and trending a project requirement?</p>		

Checklist

Remarks

Action
(X)

5. Additional Questions

Product Audit Checklist

Note:

Any major deviation from requirements shall be tagged in the 'No' column and be elaborated on in the main report under Product Audit Findings.

Documents reviewed:

Questions	YES	NO	NA
1. Are input data available?			
2. Have they been formally issued?			
3. Have the data been qualified? (what is/is not included)			
4. Have they been screened for completeness?			
5. Have calculations been performed?			
6. Have these calculations been checked?			
7. Has the product been formally checked?			
8. Is checking evidence available?			
9. Do the issued documents contain sufficient information?			
10. Have multi-discipline input/comments been obtained?			
11. Are the issued documents checked for compliance with client, licensor and authority specifications?			
12. Have all deviations from client, licensor and authority specifications been discussed and formally agreed upon with the relevant party?			
13. Are supplier data included in the document?			
14. Have supplier data been qualified?			
15. Have all requirements of the document been covered?			
16. Have the document requirements been discussed with the internal client?			
17. Have the document requirements been discussed with the external client?			
18. Have any comments been received on earlier issues of the document?			
19. Have all comments been incorporated in later issues?			
20. If not, has agreement been reached about the implementation of comments?			
21. Have changes been clearly indicated?			
22. Has the PM or EM been involved in this discussion in case of comments from the client?			
23. Has the document been reviewed by the discipline manager or his delegate, if required?			
24. Has the document been formally approved at the proper authorization level?			