

**AUDIT CHECKLIST****Simple Steel Bridges****KEY**

**Sat:** Satisfactory – Items that are compliant with the requirements.

**Uns:** Unsatisfactory - Items that are not compliant with the requirements of the checklist.

Notes/References in brackets [ ] are provided for use by firms certified for both bridge and building fabrication.

#	ITEM	Sat	Uns	Notes/Reference
<b><u>GENERAL MANAGEMENT</u></b>				
<b>A.1</b>	<b>Policy</b>			
A.1.a <b>(E)</b>	Is there a written policy statement adequately describing company policy, goals and commitment to quality?			[Bld. Std. 5.1]
A.1.b	Has the statement been disseminated to proper levels of personnel as reflected by their attitude, activities and awareness of quality goals?			[Bld. Std. 5.1]
<b>A.2</b>	<b>Organization</b>			
A.2.a	Are functions affecting quality assigned to positions that are adequately defined by job descriptions and an organization chart?			[Bld. Std. 5.4]
A.2.b <b>(C)</b>	Are personnel qualified for and capable of, performance of their duties? (Qualifications include continuing education and/or society activities for professionals).  <u>Qualifications:</u> <ul style="list-style-type: none"> <li>• General Manager, Chief Engineer, Operating Manager – 5 years steel fabrication experience or training.</li> <li>• QC Manager, Purchasing Manager – 3 years steel fabrication experience or training.</li> </ul> <p>One position in any category may be short of the requirement to allow for personnel changes.</p>			<b>Audit Policy #16</b> [Bld. Std. 5.4.1, 7.2.2.1, 13.1]
<b>A.3</b>	<b>Procedures</b>			
A.3.a <b>(C)</b>	Does management review project quality requirements prior to production, allocate adequate resources, assign or contract for project activities by suitably qualified personnel and select or create necessary quality procedures for the work?			[Bld. Std. 6, 7.1.1]
A.3.b <b>(E)</b>	Are quality requirements particular to projects (like coating requirements, weld restrictions, etc.) effectively communicated to plant departments?			[Bld. Std. 6, 7.1.1]
A.3.c	Are fabrication and erection requirements (like adjustment needs, erection aids and sequencing of NDT) and priorities reviewed prior to production?			[Bld. Std. 6, 7.1.1]

**AUDIT CHECKLIST****Simple Steel Bridges**

#	ITEM	Sat	Uns	Notes/Reference
A.3.d	<i>Not used</i>			
A.3.e	<i>Not used</i>			
A.3.f	Are drawing, material and production due dates scheduled (by suitable areas or sequences) and are schedules disseminated to appropriate personnel?			
A.3.g	Are drawing, material and production schedules maintained and current throughout the year?			
A.3.h	<i>Not used</i>			
A.3.i	<i>Not used</i>			
A.3.j	Are requests for information documented?			[Bld. Std. 7.1.1, 9]
<b>A.4</b>	<b>Experience</b>			
A.4.a (E)	Has the fabricator supplied simple bridges or provided training for the work force?			
A.4.a.1	<i>Not used</i>			
A.4.a.2 (FC)	Has the fabricator supplied fracture critical bridges or members or has the fabricator supplied non-fracture critical bridges and documented a fracture control procedure and training?			Audit Policy #42
<b><u>ENGINEERING &amp; DRAFTING</u></b>				
<b>B.1</b>	<b>Organization</b>			
B.1.a	Is the Drafting Manager familiar with pertinent codes and specifications?			[Bld. Std. 7.2.2.1, 7.1.1]
<b>If there is an in-house drafting room, items B.1.b - B.1.d are to be evaluated.</b>				
B.1.b	Do drafters have the ability to transfer the material requirements noted on the design drawings to advance bills of material for their use by the Purchasing Department?			[Bld. Std. 7.1.1]
B.1.c	Do drafters have adequate knowledge of the applicable material specifications?			[Bld. Std. 7.1]
B.1.d	Do drafters have adequate knowledge of mill rolling practices as they affect structural steel?			[Bld. Std. 7.1.1]

**AUDIT CHECKLIST****Simple Steel Bridges**

#	ITEM	Sat	Uns	Notes/Reference
<b>If detail drawings are sublet, items B.1.e - B.1.g are to be evaluated.</b>				
B.1.e (C)	Are details sublet to a qualified structural drafting firm that has a drafting manager who is an engineering technician (some trade school or college training and/or experience) and is familiar with codes and specifications?			[Bld. Std. 7.2.3]
B.1.f (C)	Does the in-house drafting manager assure that instructions are furnished to the sublet drafters?			[Bld. Std. 7.2.3, 7.2.2.1]
B.1.g	Does the in-house drafting manager take action to assure quality compliance by outside detailers?			[Bld. Std. 7.2.3, 7.2.2.1]
<b>If there is an in-house Engineering Department, items B.1.h and B.1.i are to be evaluated.</b>				
B.1.h	Is there a person capable of supervising in-house design or evaluating and coordinating outside design?			[Bld. Std. 7.2.2.1]
B.1.i	Does the company have adequate in-house design engineers or does it consistently use consultants qualified by registration or experience?			[Bld. Std. 7.2.2.1, 7.2.2.2, 10.2]
<b>B.2</b>	<b>Procedure</b>			
B.2.a	Does the drafting department maintain a current log of design drawings and specification receipts with the latest revisions and dispositions?			[Bld. Std. 7.1.3, 8]
B.2.b	Is there a procedure for the control, distribution and revision of job specifications and special provisions to appropriate plant and quality control personnel?			[Bld. Std. 7.1.3, 8]
B.2.c	Are there provisions to assure that obsolete drawings are destroyed or isolated from use throughout the plant? (May be assured by other departments).			[Bld. Std. 8.5]
B.2.d (C)	Does the drafting department maintain a current log of shop detail drawings with latest approval, revisions and dispositions?			[Bld. Std. 7.1.3, 8]
B.2.e	Are drafting practices coordinated with erection requirements?			[Bld. Std. 7.1.1]
B.2.f	Are company drafting standards adequate?			[Bld. Std. 7.1.2]
B.2.g (C)	Are detail drawings checked by qualified personnel?			[Bld. Std. 7.2.2.2]

**AUDIT CHECKLIST****Simple Steel Bridges**

#	ITEM	Sat	Uns	Notes/Reference
B.2.h (E)	Are all detail drawings reviewed or approved by the owner?			[Bld. Std. 7.1.3.2]
B.2.i (FC)	Is fracture critical material identified on advance bills and detail drawings?			
B.2.j (FC)	Are FC welds noted on detail drawings?			
<b>B.3</b>	<b>Facilities and Resources</b>			
B.3.a (C)	<p>Is there an adequate and current library including:</p> <p>AISC <i>Steel Construction Manual</i>, which includes the following specifications, codes and standards:</p> <ul style="list-style-type: none"> <li>• AISC <i>Specification for Structural Steel Buildings</i></li> <li>• RCSC <i>Specification for Structural Joints Using ASTM A325 or A490 Bolts</i></li> <li>• AISC <i>Code of Standard Practice for Steel Buildings and Bridges</i></li> </ul> <p>AISC/NISD <i>Detailing for Steel Construction</i></p> <p>ANSI/AASHTO/AWS D1.5 <i>Bridge Welding Code</i></p> <p>ANSI/AASHTO/AWS A2.4 <i>Standard Symbols for Welding, Brazing, and Nondestructive Examination</i></p> <p>ASTM and AASHTO standards as required based on material stored and being used in the shop (Min. AISC <i>Selected ASTM Standards for Structural Steel Fabrication</i> or current individual copies)</p> <p>SSPC <i>Steel Structures Painting Manual, Volume I, Good Painting Practice</i></p> <p>SSPC <i>Steel Structures Painting Manual, Volume II, Systems and Specifications</i></p> <p>AREMA <i>Manual for Railway Engineering</i> 4 volume set (Optional)</p> <p>AASHTO <i>LRFD Bridge Construction Specifications</i></p> <p>Appropriate State DOT standards and specifications: (Index of State DOT Websites - <a href="http://www.fhwa.dot.gov/webstate.htm">www.fhwa.dot.gov/webstate.htm</a>)</p> <p>ASNT-TC-1A 2001</p>			Audit Policy #12 [Bld. Std. 3]
<b><u>PROCUREMENT</u></b>				
<b>C.1</b>	<b>Organization</b>			
C.1.a	Are buyers familiar with ordering information required to control variables affecting quality of purchased material?			[Bld. Std. 5.4.1, 10.1]

**AUDIT CHECKLIST****Simple Steel Bridges**

#	ITEM	Sat	Uns	Notes/Reference
<b>C.2</b>	<b>Procedures</b>			
C.2.a (E)	Is material ordered in accordance with the design drawings and specifications?			[Bld. Std. 10.1]
C.2.b (C)	Are procedures in effect to assure subcontract fabrication is ordered to contract requirements?			[Bld. Std. 10.2]
C.2.c	Are procedures in effect to assure purchased product and subcontract fabrication is furnished to contract requirements?			[Bld. Std. 10, 10.2]
C.2.d (E)	Where a level of certification is required by contract documents, is appropriate fabrication sublet to fabricator holding the required certification?			[Bld. Std. 10.2]
C.2.e	Are procurement sources adequately evaluated?			[Bld. Std. 10]
C.2.f	Are all other purchased material (bolts, paint, castings, etc.) checked for conformance to purchasing documents upon receipt?			Audit Policy #36 [Bld. Std. 10.3]
C.2.g	Are controls set up to assure adequate identification of incoming purchased items?			[Bld. Std. 13.2.1]
C.2.h (E)	Are manufacturers' test reports or certificates of conformance of bolts, weld wire, paint, etc., kept on file?			Audit Policy #8, #36 [Bld. Std. 10.3, 11]
<b>C.3</b>	<b>Facilities and Resources</b>			
C.3.a	Are current copies of ASTM, AASHTO and AREMA specifications available to purchasing personnel?			Audit Policy #2, #12
<b><u>OPERATIONS</u></b>				
<b>D.1</b>	<b>Organization</b>			
D.1.a (E)	Is shop supervision conversant with current workmanship provisions of AWS, AREMA, AISC & AASHTO specifications?			Audit Policy #2, #12
D.1.b (C)	Does the fabricator have a competent welding technician, supervisor or outside expert available on call?			
D.1.c (C)	Are welders qualified per ANSI/AASHTO/ AWS?			Audit Policy #1, #40

**AUDIT CHECKLIST****Simple Steel Bridges**

#	ITEM	Sat	Uns	Notes/Reference
<b>D.2.a</b>	<b>Procedures &amp; Practices Material Receipt &amp; Storage</b>			
D.2.a.1 <b>(E)</b>	Is the grade of material and marking verified prior to fabrication?  <i>Note: Material markings required. Inbound raw material is to be marked per ASTM A6. Specification and grade are to be identifiable on all material in stock. Color codes are acceptable. (This means no marking on A36). Domestic shapes over 6" in cross section have raised mill marks.</i>			<b>Audit Policy #8</b> [Bld. Std. 11, 13.2.1]
D.2.a.2 <b>(C)</b>	Are welding electrodes, flux, bolts and paint stored properly and identified (including RCT lot when applicable)?			<b>AWS D1.5</b> [Bld. Std. 10.3]
D.2.a.3 <b>(C)</b>	Are flux and rod ovens adequate and operating per AWS latest adoption?			<b>Audit Policy #2; AWS D1.5</b> [Bld. Std. 3]
<b>D.2.b</b>	<b>Procedures &amp; Practices Fabrication</b>			
D.2.b.1 <b>(E)</b>	Is fabrication in accordance with contract documents and specifications and are finished products shipped in accordance with approved detail drawings?			<b>Audit Policy #8</b> [Bld. Std. 5.1, 17]
D.2.b.2 <b>(E)</b>	Is there a procedure for handling revisions and voided drawings?			[Bld. Std. 8, 8.3, 8.5]
D.2.b.3	Is material inspected for conformance to ASTM A6?			[Bld. Std. 11, 13.2]
D.2.b.4 <b>(E)</b>	Is material identity retained during fabrication and restocking?			[Bld. Std. 11]
D.2.b.5	During the inspection process, are the welds traceable to the welders who produce them?			<b>Audit Policy #40</b>
D.2.b.6	Do welders know, comply with and check their welds to the workmanship and technique requirements of AISC & AASHTO/AWS?			<b>Audit Policy #1, #2</b> [Bld. Std. 3, 12, 12.1]
D.2.b.7	Is workmanship checked throughout the fabrication process to conform to contract documents and specifications? Is checking in accordance with the company inspection procedure?			<b>Audit Policy #19</b> [Bld. Std. 13.2.2]
D.2.b.8 <b>(C)</b>	Are approved written weld procedures in close proximity to and used by the welders?			<b>Audit Policy #1, #1a, #4</b> [Bld. Std. 8.4, 12.1]

## AUDIT CHECKLIST

## Simple Steel Bridges

#	ITEM	Sat	Uns	Notes/Reference
D.2.b.9 (C)	Are written bolt tightening procedures used? <i>Note: There are four types of bolted joints: loose to slip, snug, tensioned not slip critical &amp; slip critical. The last two require tensioning. If some bolts are to be left snug, the snug condition is to be distinguished from tightened on drawings. Joints in which bolts are tensioned demand pulling up until faying surfaces are in contact. There are four approved methods of tightening bolts. Calibrated wrench requires Skidmore sample of each size and length from each lot to establish proper torque. Torque is to be re-established if bolts show any sign of weathering. TCs require Skidmore sampling if there is any sign of weathering, turn of nut requires marking of the bolted surface to show the amount turned. Bolts for bridges require sampling per AASHTO. Slip critical joints require masking of the faying surfaces, not the head/nut surfaces.</i>			Audit Policy #13 [Bld. Std. 12.2]
D.2.b.10	Are there adequate provisions for control of surface preparation if painting is done in-house?			Audit Policy #28 [Bld. Std. 3, 12.4]
D.2.b.11	Are provisions for agitation, temperature and humidity measurement and methods of paint application adequate and functional?			Audit Policy #28 [Bld. Std. 3, 12.4]
D.2.b.12	Are provisions for wet and dry film measurement and control adequate and functioning?			[Bld. Std. 3, 12.4]
D.2.b.13	Are there provisions for suitable loading, blocking and bracing for shipment?			[Bld. Std. 17]
<b>D.2.c</b>	<b>Procedures &amp; Practices Nonconformances</b>			
D.2.c.1 (E)	Is there a functioning, written procedure for disposition of nonconforming material or work in process rejected by QC personnel?			[Bld. Std. 15]
D.2.c.2	Is an effective system used to indicate conforming or nonconforming work in process?			[Bld. Std. 15]
D.2.c.3	Does the procedure include provision for action to avoid future nonconforming work?			[Bld. Std. 5.2]
<b>D.2.d</b>	<b>Procedures &amp; Practices Equipment Condition</b>			
D.2.d.1	<i>Not used</i>			
D.2.d.2 (C) (FC)	Are welding machines checked every three months to ensure correct amp and volt readings and is a record kept?			Audit Policy #15

**AUDIT CHECKLIST****Simple Steel Bridges**

#	ITEM	Sat	Uns	Notes/Reference
<b>D.3</b>	<b>Facilities and Resources</b>			
D.3.a <b>(C)</b>	Does the fabricator have automatic or semi-automatic equipment for making continuous welds?			
D.3.b <b>(C)</b>	Does the fabricator have mechanically-guided burning equipment?			
D.3.c	Does the fabricator have wheelblast or sandblast equipment? (May be NA if a qualified contractor is used for painting)			<b>Audit Policy #28</b>
D.3.d	Does the fabricator have mechanical paint agitators and other painting equipment? (May be NA if a qualified subcontractor is used for painting.)			<b>Audit Policy #28</b>
D.3.e	If the fabricator is involved in metalizing and stud welding, is his equipment adequate? (May be NA depending on the type of work)			<b>Audit Policy #28</b>
D.3.f	Does the fabricator have adequate and accurate hole-making equipment (punches and drills)?			
D.3.g	Does the fabricator have adequate and accurate cutting and finishing equipment (shears, saw, milling machine, planer and/or grinder)?			
D.3.h	Does the fabricator have material handling equipment including cranes to move material without damage?			
D.3.i	Is housekeeping adequate?			<b>[Bld. Std. 5.4.2]</b>
D.3.j	Is the air supply adequate?			<b>[Bld. Std. 5.4.2]</b>
D.3.k	Is the electrical supply adequate?			<b>[Bld. Std. 5.4.2]</b>
D.3.l	<i>Not used</i>			
D.3.m	Does the operations manager have space and assistance to permit efficient performance?			<b>[Bld. Std. 5.4.2]</b>
<b><u>QUALITY CONTROL</u></b>				
<b>E.1</b>	<b>Organization</b>			
E.1.a <b>(C)</b>	Are there qualified shop inspectors?			<b>Audit Policy #16 [Bld. Std. 13.1]</b>
E.1.b <b>(C)</b>	Is there a functioning program for training shop inspectors?			<b>Audit Policy #16 [Bld. Std. 18]</b>

**AUDIT CHECKLIST****Simple Steel Bridges**

#	ITEM	Sat	Uns	Notes/Reference
E.1.c <b>(FC)</b>	Is there at least one Certified Level III NDE administrator in-house or available under contract certified in accordance with ASNT-TC-1A?			<b>Audit Policy #16</b>
E.1.d	Does the QC organization include at least one Certified Level II magnetic particle inspection technician certified in accordance with ASNT-TC-1A on staff or available from outside sources?			
E.1.e	<i>Not used</i>			
E.1.f	<i>Not used</i>			
E.1.g	Is there a qualified testing service available and used, if required?			
E.1.h <b>(FC)</b>	Does the fabricator have a welding inspector who holds an AWS CWI certificate in his employ?			<b>Audit Policy #2, #16, #27</b>
E.1.i	Are there procedures for certifying and updating NDE personnel?			
<b>E.2</b>	<b>Procedures and Practices</b>			
E.2.a <b>(C)</b>	Is there a written quality assurance system and are quality procedures followed?			<b>[Bld. Std. 5.6.2]</b>
E.2.b <b>(C)</b>	Is there separation of responsibility for the Production Supervision function and the Quality Control Supervision function?			<b>[Bld. Std. 5.4.1]</b>
E.2.c	Is the in-process and final inspection procedure implemented?			<b>[Bld. Std. 13]</b>
E.2.d	Do all pieces receive a final inspection and is a record kept of this inspection?			<b>Audit Policy #19 [Bld. Std. 13.2.3, 13.2.4]</b>
E.2.e <b>(E)</b>	Does Quality Control have authority to stop and responsibility to inform the operating supervisor of nonconforming work?			
E.2.f <b>(C)</b>	Is a record kept of all inspection such as by noted detail drawings?			<b>[Bld. Std. 13.2.4]</b>
E.2.g <b>(C)</b> <b>(FC)</b>	Is a check made to ensure that (approved if required) welding procedures are distributed and following in the shop?			<b>Audit Policy #1, #1a</b>
E.2.h <b>(C)</b>	Is surface preparation (including grinding and fins) checked prior to painting?			<b>[Bld. Std. 12.4]</b>
E.2.i <b>(C)</b>	Is the coating checked after application?			<b>[Bld. Std. 12.4]</b>

**AUDIT CHECKLIST****Simple Steel Bridges**

#	ITEM	Sat	Uns	Notes/Reference
E.2.j	Are there adequate procedures for liaison with outside inspectors?			
<b>E.3</b>	<b>Facilities and Resources</b>			
E.3.a <b>(C)</b>	Do inspectors have the following equipment available? Tapeline Welding gages Tag system			[Bld. Std. 5.4.3]
E.3.b	Is the following equipment available: X-ray including viewing room and viewer, UT scope, MPT equipment, LPT equipment, Isotope?			Audit Policy #28
E.3.c	Are there reference standards for periodically calibrating: Paint gauges, tapeline, NDE equipment, torque wrenches (Skidmore)?			Audit Policy #15 [Bld. Std. 14]
E.3.d	Are inspection tools calibrated as required to perform the intended use?			Audit Policy #15 [Bld. Std. 14]

Note: A bold border line on left side of the checklist matrix marks changes from the previous revision.

**AUDIT CHECKLIST****Simple Steel Bridges**

For the Certification: **SIMPLE BRIDGES**, the following maximum unsatisfactory questions are allowed:

**Essential Questions:**

General Management	0 missed questions allowed	missed of 3 total	A.1.a, A.3.b, A.4.a
Engineering & Drafting	0 missed questions allowed	missed of 1 total	B.2.h
Procurement	0 missed questions allowed	missed of 3 total	C.2.a, C.2.d, C.2.h,
Operations	0 missed questions allowed	missed of 6 total	D.1.a, D.2.a.1, D.2.b.1, D.2.b.2, D.2.b.4, D.2.c.1
Quality Assurance	0 missed questions allowed	missed of 1 total	E.2.e

**Essential Fracture Critical Questions:**

Fracture Critical	0 missed questions allowed	missed of 7 total	A.4.a 2, B.2.i, B.2.j D.2.d.2, E.1.c, E.1.h, E.2.g
-------------------	----------------------------	-------------------	---

**Critical Questions:**

General Management	1 missed question allowed	missed of 2 total	A.2.b, A.3.a
Engineering & Drafting	1 missed question allowed	missed of 5 total	B.1.e, B.1.f, B.2.d, B.2.g, B.3.a
Procurement	1 missed question allowed	missed of 1 total	C.2.b
Operations	2 missed question allowed	missed of 9 total	D.1.b, D.1.c, D.2.a.2, D.2.a.3, D.2.b.8, D.2.b.9, D.2.d.2, D.3.a, D.3.b
Quality Assurance	2 missed question allowed	missed of 9 total	E.1.a, E.1.b, E.2.a, E.2.b, E.2.f, E.2.g, E.2.h, E.2.i, E.3.a

**Non-Essential Questions:**

General Management	3 missed questions allowed	missed of 6 total	A.1.b, A.2.a, A.3.c, A.3.f, A.3.g, A.3.j
Engineering & Drafting	4 missed questions allowed	missed of 12 total	B.1.a, B.1.b, B.1.c, B.1.d, B.1.g, B.1.h, B.1.i, B.2.a, B.2.b, B.2.c, B.2.e, B.2.f
Procurement	3 missed questions allowed	missed of 6 total	C.1.a, C.2.c, C.2.e, C.2.f, C.2.g, C.3.a
Operations	6 missed questions allowed	missed of 20 total	D.2.b.3, D.2.b.5, D.2.b.6, D.2.b.7, D.2.b.10, D.2.b.11. D.2.b.12, D.2.b.13, D.2.c.2, D.2.c.3, D.3.c, D.3.d, D.3.e, D.3.f, D.3.g, D.3.h, D.3.i, D.3.j, D.3.k, D.3.m
Quality Assurance	3 missed questions allowed	missed of 10 total	E.1.d, E.1.g, E.1.h, E.1.i, E.2.c, E.2.d, E.2.j, E.3.b, E.3.c, E.3.d