construction manual

MANUAL OF CONSTRUCTION WITH STEEL DECK

EDITION

3

STEEL DECK INSTITUTE

sdi®

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Since hazards may be associated with the handling, installation, or use of steel deck and its accessories, prudent construction practices should always be followed. The Steel Deck Institute recommends that parties involved in the handling, installation or use of steel deck and its accessories review all applicable manufacturers' safety data sheets, applicable rules and regulations of the Occupational Safety and Health Administration and other government agencies having jurisdiction over such handling, installation or use, and other relevant construction practice publications.

MANUAL OF CONSTRUCTION WITH STEEL DECK

THIRD EDITION

MOC3-2016

STEEL DECK INSTITUTE

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FOREWARD

This Manual is intended to be an aid and general guide for the safe and proper erection of steel deck. The objectives are safety, which is always paramount, and providing a good quality job. This Manual is not intended to define specific duties or responsibilities of any of the participants involved in doing the work nor is it intended to replace necessary contract documents. Each participant - the designer, the deck manufacturer, the general contractor, the deck erector, the owner, and each individual worker - should be aware of their individual responsibilities, as defined in the contract documents, so that the job environment will be as safe as possible and also to produce a good job.

While the information presented in this Manual has been prepared in accordance with generally recognized engineering principles and accepted construction practice, it is recommended that it be reviewed by the design professional and the builder for its applicability for any specific job.

The First Edition of the Steel Deck Institute Manual of Construction with Steel Deck (MOC1) was published in 1992. The efforts of many individuals associated with the manufacture and field usage of steel deck at that time contributed to the success of that publication and are gratefully acknowledged. The Second Edition was published in 2006. Much of that Edition was reprinted from MOC1. Additional information reflecting changes in construction practices due to the adoption of OSHA 1926 Subpart R – Steel Erection was included in MOC2. The Third Edition also includes much of the work that went into the previous two Editions. The addition of information taken from the ANSI/SDI QA/QC *Standard for Quality Control and Quality Assurance for Installation of Steel Deck* is included in MOC3.

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PRODUCT DESCRIPTIONS

1. General - All Deck Products

Steel deck is made by cold forming structural grade sheet steel into a repeating pattern of parallel ribs. The strength and stiffness of the panels are a result of the shape of the ribs and the material properties of the steel. Deck lengths can be varied to suit job conditions but, because of shipping considerations, are usually less than 40'. Standard deck width varies with the product used but full sheets are usually 12", 18", 24", 30" or 36". Deck is typically furnished in a standard width with the ends square cut. Any cutting for width, such as at openings or for angular fit, is done at the job site.

Deck is typically attached to the building frame with arc spot welds (also referred to as "puddle welds"), self drilling screws or powder or pneumatically driven pins. Sheet to sheet fastening is done with screws, button punching (crimping), clinching, or welds.

2. Composite Floor Deck

After installation and adequate fastening, floor deck serves several purposes. It (a) acts as a working platform (b) stabilizes the frame (c) serves as concrete form for the slab and (d) reinforces the slab to carry the design loads applied during the life of the building. Composite decks are distinguished by the presence of shear connector devices as part of the deck. These devices are designed to mechanically lock the concrete and deck together so that the concrete and the deck work together to carry subsequent floor loads. The shear connector devices can be rolled in embossments, lugs, holes or wires welded to the panels. The deck profile configuration can also be used to interlock concrete and steel.

Composite deck finishes are either galvanized (zinc coated) or bare/painted. Bare/painted deck has a bare top surface, which is the side to be in contact with the concrete. This bare top surface can be expected to develop rust before concrete is placed. The bottom side of the deck has a primer coat of paint. (See the next section on Roof Deck for a description of primer paint.) Galvanized deck has a zinc coating on both sides.

Composite floor deck is normally installed so the panel ends do not overlap on the supporting beams. Shear lugs or profile shape often prevent a tight metal-to-metal fit if panel ends overlap. The air gap caused by overlapping prevents proper fusion with the structural steel when sheet end laps are shear stud welded.

Adequate end bearing of the deck must be obtained as shown on the erection drawings. If bearing is actually less than shown, further investigation is required.

See Figure 1A for examples of typical composite floor deck profiles.

3. Roof Deck

Roof deck is not designed to act compositely with other materials. Roof deck acts alone in transferring horizontal and vertical loads into the building frame. Roof deck rib openings are usually narrower than floor deck rib openings. This provides adequate support of rigid thermal insulation board.

Roof deck is typically installed to end lap approximately 2" over supports. However, it can be butted (or lapped more than 2") to solve field fit problems. Since designers frequently use the installed deck system as part of the horizontal bracing system (the deck as a diaphragm), any fastening substitution or change should be approved by the designer. Continuous perimeter support of the deck is necessary to limit edge deflection in the finished roof and may be required for diaphragm shear transfer.

Standard roof deck finishes are galvanized or primer painted. The standard factory applied paint for roof deck is a primer paint and is not intended to weather for extended time periods. Field painting, touch up of abrasions and deterioration of the primer coat or other protective finishes are the responsibility of the buyer. It is recommended, however, that any field paint be applied over a small test area of the primed deck and tested for compatibility and adhesion prior to proceeding with field painting. Special paint, or paint to be applied over galvanizing, is available on special order but must be adequately described to the manufacturer before bidding.

See Figure 1B for examples of typical roof deck profiles.

4. Non-Composite Form Deck

Form deck can be any floor or roof deck product used as a concrete form. Connections to the frame are by the same methods used to attach floor and roof deck. Welding washers are required when welding metal thickness is less than 0.028 inches.

Form deck is furnished galvanized, prime painted or uncoated. Galvanized deck must be used for roof deck systems where the deck is used to carry a lightweight insulating concrete fill.

In a patented, dry installed roof deck assembly, form deck is utilized as the primary load carrying element. This assembly functions as a structural roof deck diaphragm. The assembly may include dry installed thermal insulation placed above either prime painted, field painted galvanized or galvanized and painted steel sections.

See Figure 1C for examples of typical non-composite form deck profiles.

5. Cellular Deck

Cellular deck is made by attaching a bottom steel sheet or another deck section to a roof deck or composite floor deck panel. Cellular deck can be used in the same manner as floor deck. Electrical, telephone and computer wires are easily run through the chase created between the deck panel and the bottom sheet.

When used as a part of the electrical distribution system, the cellular deck must be installed so that the ribs line up and create a smooth cell transition at abutting ends. The joint that occurs at butting cell ends must be taped or otherwise protected to prevent concrete from entering the cell. Cell interiors must be free of welding burrs or other sharp intrusions to prevent damage to wires.

When used as roof deck, the bottom flat plate is usually left exposed to view. Care must be exercised during erection to maintain alignment and prevent damage.

Cellular deck is sometimes used with the flat plate on the topside to provide a flat walking surface. Installation of deck for this purpose requires special methods for attachment to the frame because the flat plate now on the top can prevent direct access to the deck material that is bearing on the structural steel. It may be advisable to treat the flat top surface to prevent slipping.

Cellular deck is always furnished galvanized or painted over galvanized.

See Figure 1D for examples of typical cellular deck profiles.

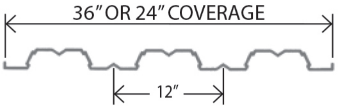
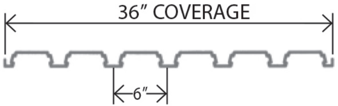
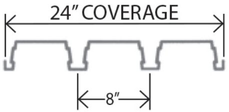
6. Acoustic Deck

Acoustical decks are typically manufactured by perforating the webs in non-cellular deck, or the bottom sheet in cellular deck. Sound absorbing material is installed within the ribs of the deck. In open rib decks, the sound absorbing elements are normally field installed by the roofing contractor shortly before installation of the exposed roof. For cellular decks, sound absorbing material may be factory installed. Sound absorbing material that is to be field installed shall be stored at the jobsite in such a manner as to ensure adequate protection prior to installation. Sound absorbing material that becomes contaminated with any substance other than clean water must be replaced. Refer to the SDI Code of Standard Practice for further information. Individual sound absorbing elements are sometimes specified to be supplied as encapsulated. The encapsulating material is not intended to act as complete protection prior to installation and is NOT to be removed during or after installation.

See Figures 1E, 1F, and 1G for examples of typical acoustic deck profiles.

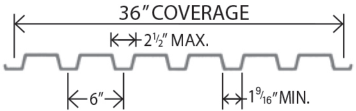
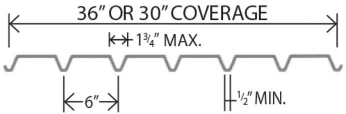
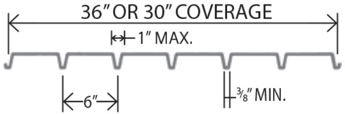
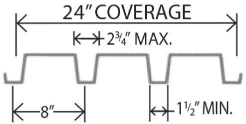
Sound absorption coefficients and NRC ratings are dependent on deck perforation size and pattern and on acoustical and supplemental rigid insulation size and density. Consult an SDI Member Company for project specific requirements.

FIGURE 1A - TYPICAL COMPOSITE DECK PROFILES

Composite Floor Deck Profiles	Name	Nominal Thickness Range	Weight Range	Comments
	1 ½″ X 12″ 2″ X 12″ 3″ X 12″ Composite	.03″ to .06″	2 psf to 4 psf	Embossment patterns will vary from manufacturer to manufacturer. Side laps are flat adjustable or button punchable.
	Varies	.03″ to .06″	2 psf to 4 psf	Dovetail profiles are available from several manufacturers. Dimensions vary. May also be used as roof deck. Contact the manufacturer for additional information regarding dovetail profiles.
	1 ½″ X 6″ Composite	.03″ to .06″	2 psf to 5 psf	Embossment patterns will vary from manufacturer to manufacturer. Side laps are flat adjustable or button punchable.
	3″ X 8″ Composite	.03″ to .06″	2 psf to 4 psf	Embossment patterns will vary from manufacturer to manufacturer. Side laps are flat adjustable or button punchable. This profile is not generally suitable for use with shear studs.

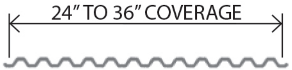
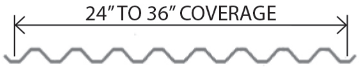
All Dimensions are nominal.

FIGURE 1B - TYPICAL ROOF DECK PROFILES

Roof Deck Profiles	Name	Nominal Thickness Range	Weight Range	Comments
	1 ½" X 6" Wide Rib (WR)	.03" to .06"	2 psf to 4 psf	May be referred to as "B" deck. Sidelaps may be flat adjustable or button punchable. Acoustical deck will have perforated webs.
	1 ½" X 6" Intermediate Rib (IR)	.03" to .06"	2 psf to 4 psf	May be referred to as "F" deck.
	1 ½" X 6" Narrow Rib (NR)	.03" to .06"	2 psf to 4 psf	May be referred to as "A" deck.
	3" X 8" Deep Rib (DR)	.03" to .06"	2 psf to 4 psf	May be referred to as "N" deck. Sidelaps may be flat adjustable or button punchable. Acoustical deck will have perforated webs.

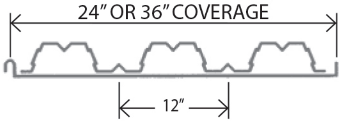
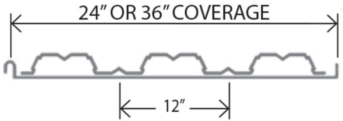
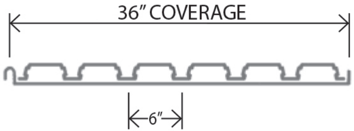
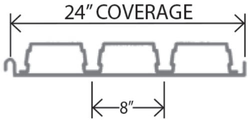
All Dimensions are nominal.

FIGURE 1C - TYPICAL NON-COMPOSITE FORM DECK PROFILES

Form Deck Profiles	Name	Nominal Thickness Range	Weight Range	Comments
	9/16" Form Deck	.014" to .030"	0.8 psf to 1.5 psf	May be referred to as Standard form deck.
	15/16" Form Deck	.017" to .040"	1.0 psf to 2.0 psf	May be referred to as Heavy duty form deck.
	1 5/16" Form Deck	.017" to .047"	1.0 psf to 2.8 psf	May be referred to as Extra heavy duty form deck.
	1 ½" or 2" Form Deck	.023" to .047"	1.4 psf to 2.8 psf	May be referred to as Super duty form deck.

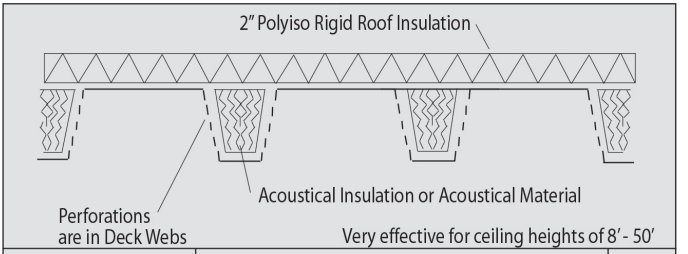
All Dimensions are nominal.

FIGURE 1D - TYPICAL CELLULAR DECK PROFILES

Cellular Floor Deck Profiles	Name	Nominal Thickness Range	Weight Range	Comments
	3″ X 12″ Composite Cellular	.03″ to .06″	4 psf to 7 psf	Bottom plate may be perforated for acoustical.
	2″ X 12″ Composite Cellular	.03″ to .06″	4 psf to 7 psf	Bottom plate may be perforated for acoustical.
	1 ½″ X 6″ Composite Cellular	.03″ to .06″	4 psf to 7 psf	May also be used as a roof deck. Bottom plate may be perforated for acoustical.
	3″ X 8″ Composite Cellular	.03″ to .06″	4 psf to 7 psf	May also be used as a roof deck. Bottom plate may be perforated for acoustical.

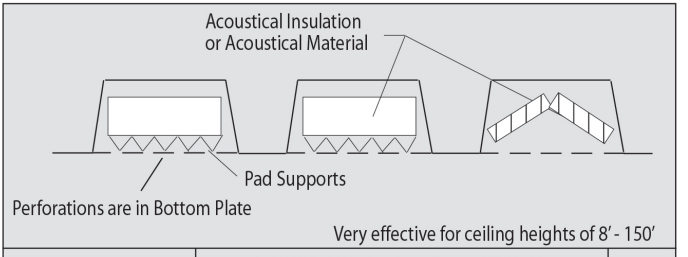
All Dimensions are nominal.

FIGURE 1E - TYPICAL 1½" & 3" ACOUSTIC ROOF DECK



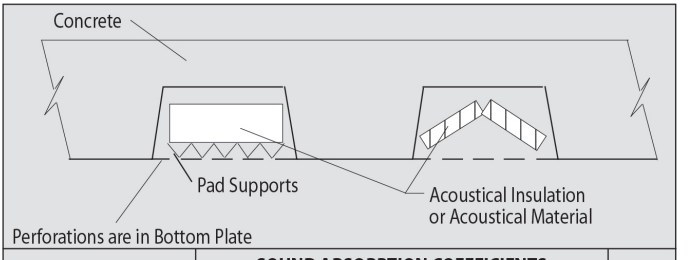
	SOUND ABSORPTION COEFFICIENTS (FREQUENCY)						NRC
	125	250	500	1000	2000	4000	
1½" Acoustic Deck	.11	.18	.66	1.02	.61	.33	.60
3" Acoustic Deck	0.18	0.39	0.88	0.93	0.58	0.39	.70

FIGURE 1F - TYPICAL CELLULAR ACOUSTIC ROOF DECK



PANEL	SOUND ABSORPTION COEFFICIENTS (FREQUENCY)						NRC
	125	250	500	1000	2000	4000	
3" Deep Cell	.47	.57	.95	.98	.82	.69	.85

FIGURE 1G - TYPICAL COMPOSITE CELLULAR ACOUSTIC FLOOR DECK



PANEL	SOUND ABSORPTION COEFFICIENTS (FREQUENCY)						NRC
	125	250	500	1000	2000	4000	
2" Deep Cell	.28	.40	.64	.84	.59	.47	.60

II. APPROVED ERECTION DRAWINGS

Only installation drawings that are marked for field use should be used for construction (i.e. stamped "APPROVED FOR CONSTRUCTION", "FIELD USE", etc.).

Prior to beginning deck erection, the erector should review the plans for overall job site orientation. On projects with multiple deck profiles and gages, individual areas should be identified for each type of deck.

All General Notes should be reviewed for special instructions. Drawing sections in particular need to be studied for installation details. The drawings and bundle tags need to be examined for proper bundle placement.

The engineer of record has approved the attachment method and pattern. Therefore, all fastening to the structure and sheet side laps should be carefully followed as shown on the "APPROVED FOR CONSTRUCTION" drawings.

III. PACKAGING

Deck is banded into bundles that can weigh several thousand pounds but the deck bundle weight will be limited to a maximum 4000 pounds for deck to be applied to joists. Deck bundle weights for material to be applied over structural steel frames or other framing systems will be as required to suit job conditions, and to meet safe hoisting, spreading and installation procedures. If heavier or lighter bundles are required because of job conditions, this information must be conveyed to the deck supplier well before production is scheduled. The deck supplier, the erector and the purchaser should all be in agreement about the bundle sizes and weights that are to be delivered to the job.

Tags (see Figure 2) on the bundles may provide some or all of the following information:

1. weight of bundle
2. deck manufacturer's contract number
3. customer name and job name
4. product description gage (thickness), product name, and finish
5. number of pieces, lengths
6. area (on job) that is to receive the bundle
7. bundle number
8. any special notices or storage instructions

Special tags, such as those required by Underwriters Laboratories or Factory Mutual, are applied to the bundle and not to the individual sheets.

Any special markings or other information (as well as special packaging) must be agreed upon prior to fabrication.

Previously agreed upon color coding is often very helpful for gage identification on a multigage project. Color coding may also be agreed upon for other quick identification purposes.

FIGURE 2
EXAMPLE OF BUNDLE TAG

STEEL DECK MANUFACTURER

CONTRACT NO.

CUSTOMER NAME
PROJECT NAME
PROJECT ADDRESS

DECK TYPE, GAGE, FINISH

NUMBER OF PIECES	LENGTH FT.	IN.	INCHES	MARK
20	27	10.00	334.00	
20	25	11.00	311.00	
5	25	7.00	307.00	
45				

NOTES:

BUNDLE NO X OF X TRUCK: XX
CONTROL NO. XXXX-XXX-XXXXX
BOM. BUNDLE NO. XX

IV. LOADING AND SHIPPING

Bundle tags show the job area (derrick) where the bundle belongs. The deck manufacturer may sequence deck bundling if requested so that deck will be delivered in a particular (or previously agreed upon) order and be unloaded and hoisted in sequences. Erection information should be made available to the deck manufacturer as soon as possible after placing the order so that sequencing can be done during preparation of approval drawings.

All job conditions that will affect shipping (i.e. weight restrictions, staging, special strapping, blocking, tarping) should be determined well in advance of fabrication so that appropriate steps can be taken by the shipper.

The deck manufacturer will load trucks using standard procedures. These procedures may consider the following:

1. Strapping will be secured, preventing blow off or loosening of sheets during transit.
2. Deck bundles may be placed against the trailer or truck bulkhead to prevent forward movement in case of a sudden stop. Note that load distribution may dictate another arrangement.
3. Deck bundles are separated with dunnage (horizontally and vertically) of at least 1 ½" (more if agreed upon) so that lifting slings can be inserted for unloading.
4. Deck will be loaded with the longest bundles on the bed of the truck to ensure that the load will be balanced.
5. To ensure safe and level loads, every other bundle may be turned on the truck. In all cases the bundle arrangement on the trailer will be made with an effort to provide the greatest stability of the load and to achieve the allowable weight.

During transportation, shock and vibration tends to compress bundles, which can result in slackening of the trailer load binders normally used in the transport of deck. This may cause a dangerous situation; over tightening of the tie downs in anticipation of settling will damage the product. Periodic adjustments and retightening are necessary. Each adjustment should also ensure that the tarps are repositioned to keep the load dry to prevent moisture from affecting the finish.

Unless partial shipments or less than truckload (LTL) shipments are agreed upon, full truckload shipments are standard. Truckloads will be determined by weight and volume. If LTL shipments are used, the deck manufacturer cannot be responsible for any damage caused by rehandling or load transfer between trucking companies.

V. RECEIVING, UNLOADING, STORAGE AND PROTECTION

Receiving and Unloading

There must be proper access to the structure for the deck delivery. The access must be adequate to support the lifting equipment and the delivery trucks. Lifting equipment must be capable of safely lifting the deck bundles and have sufficient reach to properly place the bundles on the structure.

Material should be checked as it is received. Bundles should be counted. The bill of lading should be checked to verify trailer contents. Small packages are sometimes carried inside the tractor. Check to see if all items are present. Any material damages or shortages should be noted on the bill of lading prior to signing for the material and the supplier should be immediately notified.

CAUTION:
KEEP LOAD IN SIGHT
UNTIL IT IS SAFELY LANDED.

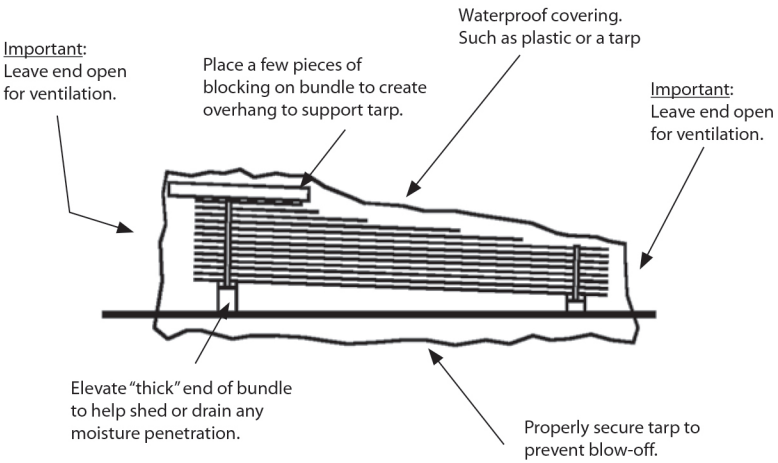
Storage and Protection

If ground storage is needed, the deck bundles should be stored off the ground, with one end elevated to provide drainage. Bundles should be protected against condensation with a ventilated waterproof covering. Bundles should be stacked so that there is no danger of tipping, sliding, rolling, shifting or material damage.

Bundles should be checked for tightness so wind cannot loosen sheets or work the bundles apart. Tightness should be periodically checked and additional securement should be used as needed. Bundles should never be hoisted by the strapping and should always be placed tag side up. When instructed to install deck inverted, this is to be accomplished as individual sheets are removed from top of bundle. It is the position of the Steel Deck Institute that; DECK BUNDLES MUST ALWAYS BE PLACED ON THE FRAME NEAR A MAIN SUPPORTING BEAM AT A COLUMN OR WALL. IN NO CASE, SHOULD THE BUNDLES BE PLACED ON UNBOLTED FRAMES OR UNATTACHED OR UNBRIDGED JOISTS. The structural frame must be properly braced to receive the bundles.

OSHA Federal Register Subpart R 1926.757 includes requirements as to how and when deck bundles may be landed on open web steel joists during the structure's erection. This OSHA regulation must be examined by anyone engaged in this activity, such that all criteria is understood and met.

FIGURE 3
RECOMMENDATION FOR PROTECTING DECK BUNDLES AT JOB SITE



Note: For more information related to the Storage and Protection of steel deck, please refer to the SDI White Paper, "Fundamentals of Corrosion and Their Application to Steel Deck".

DECK ORDERING CHECKLIST

I. DECK PROFILE

Composite Floor Deck	See Figure 1A	Page 9
Roof Deck	See Figure 1B	Page 10
Non-Composite Floor Deck	See Figure 1C	Page 11
Cellular Deck	See Figure 1D	Page 12
Acoustic Deck	See Figures 1E, 1F, 1G	Page 13

II. DECK TYPE (THICKNESS) – GAGE AND INCHES

22 (0.0295″)
20 (0.0358″)
18 (0.0474″)
16 (0.0598″)
Cellular Bottom Plate
20 (0.0358″)
18 (0.0474″)
16 (0.0598″)
Other: specify decimal thickness

III. DECK FINISH

Uncoated Both Sides
Uncoated and Prime Painted Both Sides
Uncoated and Prime Painted Bottom Side
Galvanized (G60, G90 or other) Both Sides
Galvanized and Prime Painted Bottom Side
Galvanized and Prime Painted Both Sides
Other: specify if not manufacturer's standard

IV. IS FIRE RATING REQUIRED?

Yes - Give Appropriate UL Design Number and Hours Required or FM Assembly Number

V. SHEET LENGTH LIMITS

Standard 45'
Other: specify based on jobsite conditions

VI. BUNDLE WEIGHT RESTRICTIONS

Standard 4000 lbs. maximum for joists
Other: specify based on jobsite conditions

VII. REQUIRED SPACE BETWEEN BUNDLES FOR HOISTING DEVICES

Standard 1½″
Other: specify

VIII. SPECIAL CERTIFICATIONS

UL Labels
FM Labels
Other: specify

Any special sequencing, timing, packaging or other requirements must be provided to the deck supplier. The deck supplier must be provided a complete and accurate address for shipping.

VI. ERECTION OF DECK AND JOB SITE SAFETY

Serious injury or death can result from failure to familiarize with and comply with all applicable safety requirements of federal, state and local regulations and these safety guidelines before erecting steel deck.

OSHA Federal Register Subpart R 1926 issued January 18, 2001 provides specific erection guidelines for typical conditions. However, where employers elect, due to conditions specific to the site, to develop alternate means and methods that provide employee protection, a site specific erection plan shall be developed by a qualified person. OSHA provides guidelines for establishing a site specific erection plan in Appendix A of the OSHA Federal Register Subpart R 1926. The deck manufacturer is not responsible for preparing the "site specific" erection plan. Deck erection drawings may be helpful to those preparing the plan.

Deck erectors create their own working platform. For the most part these platforms will not have protected edges or protected openings. Erectors must also work on the open steel frame and use ladders or scaffolding to access the work.

Coil ordering practices and manufacturing processes have been established and are being followed so that as-shipped deck products will be free of visible liquid lubricants and dry residues will be minimized. The purpose of establishing these practices and processes is to reduce the slipping hazard of the walking surfaces of decking products. For more information on this issue, please refer to the "Steel Coalition Lubricant Task Group Report" dated May 14, 2002. This report is available on the SDI website.

SDI Warning Label.

Alertness

Most deck installations are done on an elevated structure and the danger of falling is always present. Falls may occur at any time and at any location. Alertness is essential. Ladders should be securely tied to the structural frame or the scaffolding. Stairs, if available, should be rigidly attached to the building frame.

Access areas should be specially patrolled to keep them free of equipment, material, and debris.

Deck edges are sharp. Workers should take precautions to protect themselves from sharp edges or projecting corners.

It is very important that the structure be ready to receive the deck. Before deck bundles are placed on the frame, the frame plumbness and connections should be checked. Verify that temporary bracing is in place to keep the frame in a plumb condition until the deck is placed and secured.

CAUTION:
DECK MAY HAVE
SHARP EDGES.

Lifting

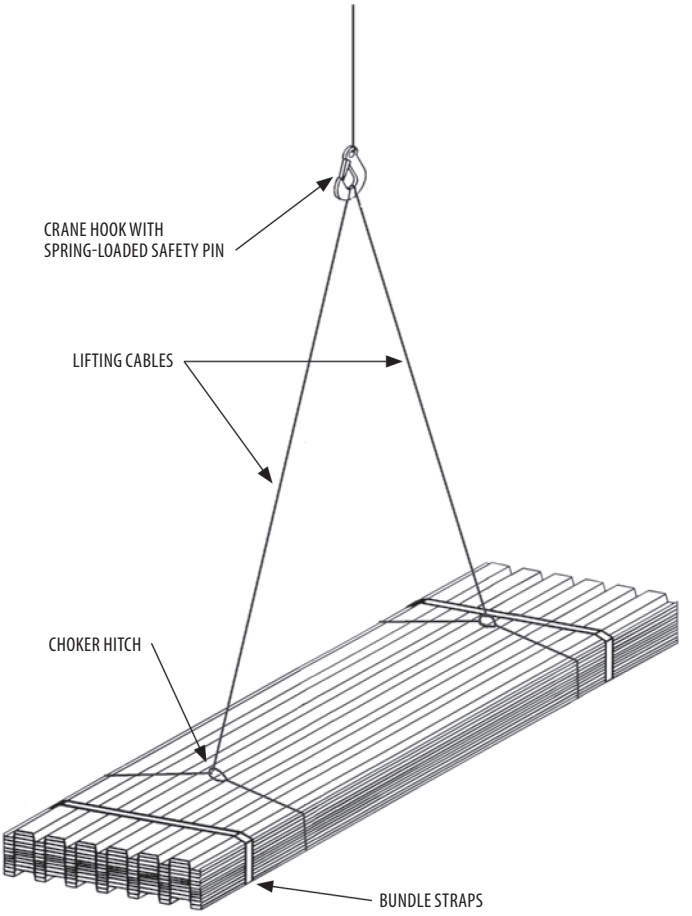
Steel joists must be securely attached at their bearing ends and have their bridging completely installed. Verify the structure's capacity to support the deck bundles.

The bundles must be rigged for lifting so that shifting and excessive tipping will not occur and so the lifting device will not damage the deck (see figure 4). All lifting equipment must be adequate for the job. The hoisting operation must be properly directed and manned. Tag lines attached to the bundles (not to the bands) will help workers control and position the load. Never move bundles by pulling on the strapping. (See Section V on Unloading). If possible, spread deck bundles out along the building column lines to create several small stacks rather than stacking all the bundles in one area. Workers should be instructed to keep the load in sight until it is safely placed on the structure. Bundles should be landed so that the ends of the bundles rest on a bearing surface rather than having one or both ends cantilevered. The bundles should be positioned for convenient spreading of sheets and oriented so individual deck sheets will not need to be turned. Bundles of deck which have been unbanded must be secured to prevent individual sheets from being blown off the structure.

NOTE: Bundle straps applied at factory are to remain on bundle until placed for erection and sheets are ready to be spread. Check for tightness.
Bundle straps are not to be used to move or lift deck bundles.

CAUTION:
KEEP THE LOAD IN SIGHT
UNTIL IT IS SAFELY LANDED.

FIGURE 4
EXAMPLE OF ONE LIFTING METHOD

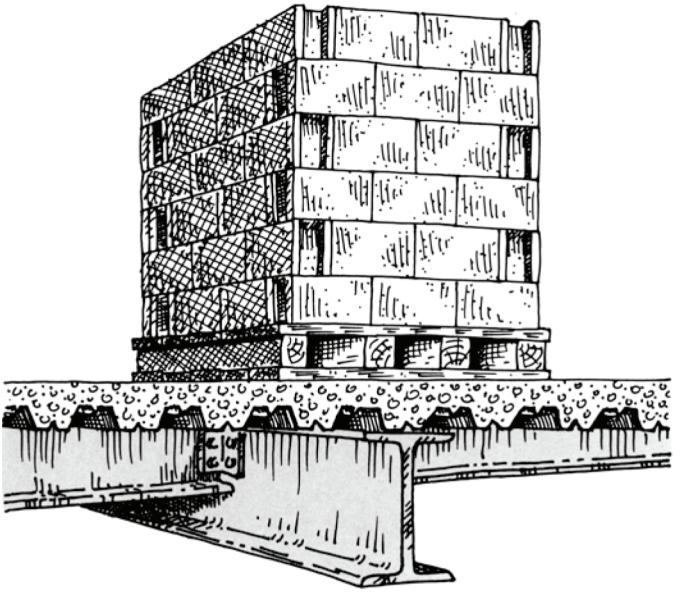


NOTE: OSHA Regulation 29 CFR Section 1926.753 (d) (2) (i) states that materials being hoisted shall be rigged to prevent unintentional displacement. Use of the "choker hitch" method as illustrated above has proven to be an effective means to accomplish this. However, under some circumstances, the use of this method may cause damage to some of the steel deck sheets in a bundle as it is being hoisted. Minor damage to the steel deck sheets may be acceptable for structural purposes. However, if the appearance of the steel deck sheets is critical, alternative lifting methods should be considered. In any case, OSHA Regulation 29 CFR Section 1926 (d) (2) (iii) states that all loads shall be rigged by a qualified rigger.

Safe Working Platform

To make the working platform safe and prevent deck damage, the deck sheets should be attached to the frame and side laps connected as soon as possible. If deck sheets are temporarily used to access bundles, they must be end bearing (not cantilevered) and must be securely attached to the frame to prevent slip off. A working area should be at least 12 feet wide. It is recommended that a working area be established around or along each bundle so that the bundle can safely be accessed. The platform can then be extended in any convenient direction. Specific job requirements need to be considered to determine deck erection starting points and erection progression. As the platform is extended it will be necessary for at least one worker to work from the structural frame. OSHA standards require that employers provide fall protection during deck erection operations and all OSHA guidelines for safety while erecting deck must be followed. Refer to OSHA Regulation 29 CFR Section 1926.760 (c) which states that under special circumstances a Contolled Deck Zone (CDZ) may be established which permits flexibility to the methods of personal fall protection.

PLACE HEAVY LOADS
OVER MAIN SUPPORTS



Placing Deck

As the deck sheets are placed, one edge of deck will always be "open" or leading. This leading edge should only be approached in order to place the next sheet. Workers should also maintain a safe distance (6 feet if possible) from the end of the deck unit. When aligning the edge (side) lap, the worker should kneel. Kneeling lowers the worker's center of gravity and decreases the chance of falling. Refer to OSHA Regulation 29 CFR Section 1926.760 (c) which states that under special circumstances a Controlled Deck Zone (CDZ) may be established which permits flexibility to the methods of deck installation.

Roof and floor holes and openings shall be decked over, unless the size of the hole or special design circumstances prevent it from being decked over. It is the responsibility of the project Engineer/Architect to define whether a hole is required to be decked over. Where large size holes or other conditions that do not allow an opening to be decked over, employees shall be protected in accordance with OSHA Regulation 29 CFR Section 1926.760 (a)(1).

Construction Loads

The SDI Standards for floor deck require a minimum uniform construction live load of 20 psf which is added to the weight of the wet concrete. This is considered adequate for typical construction applications that consist of concrete transport and placement by hose and concrete finishing using hand tools. The building designer has little control over means-and-methods of construction, and should bring to the attention of the constructor that bulk dumping of concrete using buckets, chutes, or handcarts, or the use of heavier motorized finishing equipment such as power screeds, may require design of the deck as a form using uniform construction live loads of 50 psf or greater. The SDI Standards require that the designer include the assumed construction loads in the construction documents and the constructor should verify the adequacy of the design.

Any shoring required to be installed must be installed prior to concrete placement, and depending upon the design for construction loads prior to concrete placement (required to be a minimum of 50 psf), this shoring may be required prior to the deck being loaded or walked upon.

Roof deck is not generally required to carry as much foot traffic as floor deck, but at least 20 pounds per square foot should be made available by roof deck. Areas subject to traffic or material staging should be planked. The maximum recommended spans for roof decks (see Figure 5) should also be used as a guide.

Other Trades

Other trades should be kept off the working platform and the area immediately below the working platform during the deck erection process. Care must be taken when cutting bundle straps to prevent straps or dunnage from dropping onto personnel or equipment. Workers should be instructed on all aspects of deck safety before any deck is installed. A steel deck surface is inherently slippery when wet. Caution is required by anyone on the deck when this condition exists.

FIGURE 5 - CONSTRUCTION SPAN TABLE

Recommended Maximum Spans for Construction and Maintenance Loads Standard 1 ½" and 3" Roof Deck					
Deck Type		Span Condition	Gage Number	ASD Span (ft-in)	ASD Cantilever Span (ft-in)
NARROW RIB	NR22	Single	22	2′-11″	0′-10″
	NR20		20	3′-08″	1′-00″
	NR18		18	5′-00″	1′-03″
	NR16		16	6′-05″	1′-07″
	NR22	Double or Triple	22	3′-07″	
	NR20		20	4′-06″	
	NR18		18	6′-02″	
	NR16		16	7′-11″	
INTERMEDIATE RIB	IR22	Single	22	3′-05″	0′-11″
	IR 20		20	4′-03″	1′-01″
	IR18		18	5'-10"	1′-06″
	IR16		16	7′-06″	1′-10″
	IR22	Double or Triple	22	4′-03″	
	IR20		20	5′-03″	
	IR18		18	7′-02″	
	IR16		16	9′-03″	
WIDE RIB	WR22	Single	22	5′-08″	1′-06″
	WR20		20	7′-00″	1′-10″
	WR18		18	9′-06″	2′-05″
	WR16		16	12′-02″	3′-00″
	WR22	Double or Triple	22	6′-11″	
	WR20		20	8′-07″	
	WR18		18	11′-08″	
	WR16		16	15′-00″	
DEEP RIB	DR22	Single	22	11′-11″	3′-04″
	DR20		20	15′-04″	4′-02″
	DR18		18	21′-01″	5′-07″
	DR16		16	27′-05″	7′-01″
	DR22	Double or Triple	22	14′-07″	
	DR20		20	18′-11″	
	DR18		18	26′-00″	
	DR16		16	33′-09″	

Spans shown are calculated using 33 ksi steel and Allowable Strength Design and are considered to be conservative. Longer spans may be permitted by LRFD designs or for higher strength steels. Consult the deck manufacturer for further guidance.

Refer to the deck manufacturer's catalogs or the SDI Floor Deck Design Manual (FDDM) for construction span tables for floor deck.

SAFETY NOTES

1. Make sure that rigging is adjusted to keep hoisted loads well balanced.
2. Do not stand under loads being hoisted.
3. Keep loads in view.
4. Use proper hand signals to crane operators.
5. Check erection drawings to land deck in proper position and orientation to avoid turning deck.
6. Make sure bundles are secure and stable before cutting bands.
7. Pay particular attention to single span bundles.
   a. Do not use single span bundles as a working platform.
   b. Sheets could shift due to handling. Ensure bottom sheet extends past the support at both ends, otherwise place where full support can be obtained.
8. When cutting bands on bundles, use both hands and keep clear as the bands are under tension. Eye protection is recommended.
9. Pay special attention to short sheets or single span sheets — make sure deck is firmly secured before using it as a working platform.
10. Make sure cut outs and openings are adequately supported and guarded.
11. Use chalk lines to locate supporting steel — measure accurately.
12. Be alert for sharp edges.
13. Wet deck is inherently slippery — watch your footing.
14. Keep a litter free work place.
15. Wear eye protection when near welding.
16. When installing galvanized deck on sunny days, sunglasses and sunburn protection are advisable.
17. Stay alert.

Fastening and Installing Deck

Deck is installed in accordance with the "Approved for Construction" drawings. The deck must be installed by qualified and experienced workers. The beginning point should be carefully selected for proper deck orientation and edge of roof or floor slab location.

Maintaining rib or flute alignment across the structure is very important. A snap chalk line should be used at reasonable intervals to assure proper alignment of deck panels. Panel cover widths must be maintained to achieve long straight runs of deck.

Roof deck is often left exposed on the bottom. Rib alignment must be parallel to the girders at all girder lines to prevent unsightly conditions.

Floor deck flutes should, if possible, maintain alignment to achieve continuous concrete ribs across abutting sheet ends, minimizing concrete leakage. Flutes that do not align can create closure problems that may interrupt the slab design. Proper alignment can only be achieved by proper adjustment of each deck panel as it is placed. Cover width errors accumulated across the bay cannot be corrected with the last sheets in the run.

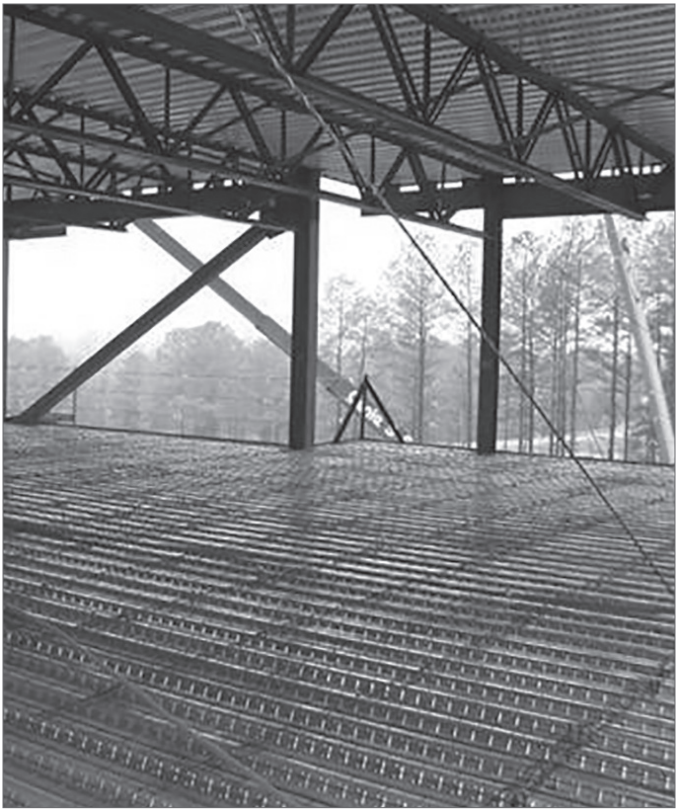
On site experience has demonstrated that the frequency of snapping a chalk line determines the accuracy of rib and flute alignment. This minor effort at the time of deck placement eliminates the need for field corrections.

For deck to perform its design functions and serve as a working platform, it must be adequately and properly attached. Often the deck is used as part of the horizontal bracing system and the fastening method and pattern have been selected to provide a certain strength and stiffness in the plane of the deck. See Figure 14 for deck attachment patterns.

NO SUBSTITUTION of fastener type or pattern should be made without the approval of the designer.

Deck fastening to the structural frame can be accomplished with welds, self drilling screws, air driven, or powder driven fasteners. A minimum of 1 ½" of end bearing should be provided for deck, unless noted otherwise on the deck installation drawings. If there is less than 1 ½" of bearing, additional fastening should be provided and the deck web crippling capacity should be checked. For deck that is intended to end lap (roof deck), the end lap location should be adjusted so the center of the lapped portion occurs over the support or, when supported by bar joists, over a top chord member.

Only qualified operators may use powder actuated tools. Operators must be trained by the tool manufacturer or other authorized party in accordance with ANSI/ASSE A10.3-2013. Air actuated tools must be used by trained operators familiar with all safety procedures.



A typical steel deck installation.

Mechanical Fastening

Screws

Special electric screw guns are used to drive self drilling screws to attach deck to the structural frame. These screw guns are equipped with a clutch and depth limiting nosepiece to prevent over torquing. Screws are typically #12's or ¼" diameter with a special drill point selected according to the total thickness of metal (deck plus frame) being joined.

Power-Actuated Fasteners (Powder Cartridge Actuated)

Powder-actuated tools are designed to drive fasteners, specifically designed for deck attachment, through the sheet metal decking and into the base steel. A powder cartridge (blank cartridge) is used as the energy source to drive the fastener into the steel. Low-velocity tools utilize a captive piston which has much greater mass than the fastener. The energy from the powder cartridge acts on the piston which in turn drives the fastener. Only low-velocity tools, designed specifically for the decking application, should be used to fasten metal deck. OSHA requires that users of these tools are qualified in the operation of the particular tool in use.

Powder-actuated fasteners are made from hardened steel, with a ballistic point to penetrate the sheet steel and base steel. The fasteners typically have a knurling pattern which improves the hold of the fastener in the steel. Powder-actuated fasteners used for decking attachment should have one or more integrated washers which serve to clamp the deck sheet metal to the base steel, thereby improving the shear resistance capacity of the connection as well as the uplift capacity.

Power-Actuated Fasteners (Compressed Gas/Air Actuated)

Air driven tools are operated at a pre-set pressure level consistent with the fastening requirements of the deck attachment. Air is supplied by a compressor or equipped with a regulator that prevents over driving or under driving the fastener. The fasteners have a flat head at the drive end and a ballistic point at the penetrating end. A variety of sizes are available to meet the penetration requirements of the steel substrate.

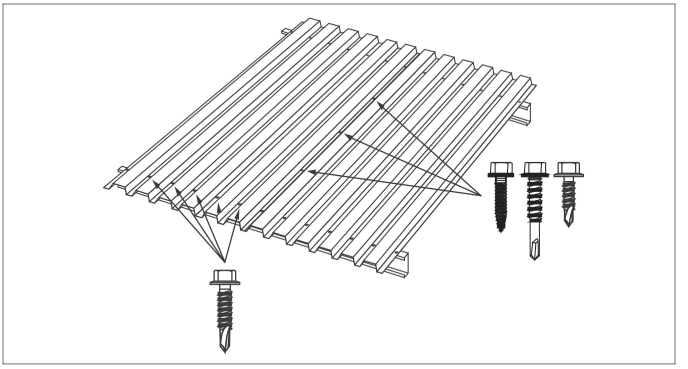


FIGURE 6A - SUPPORT AND SIDE LAP SCREWS

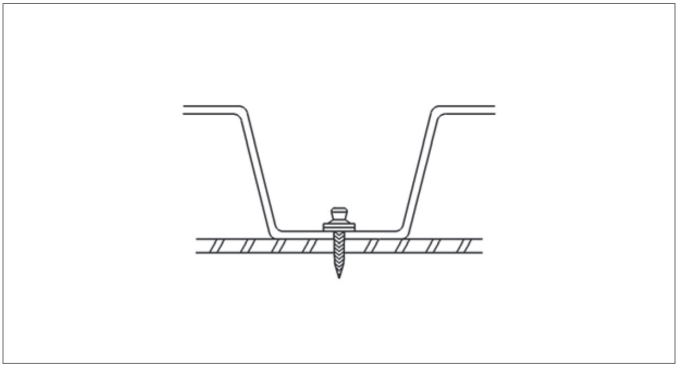


FIGURE 6B - POWER-ACTUATED FASTENER ATTACHMENT

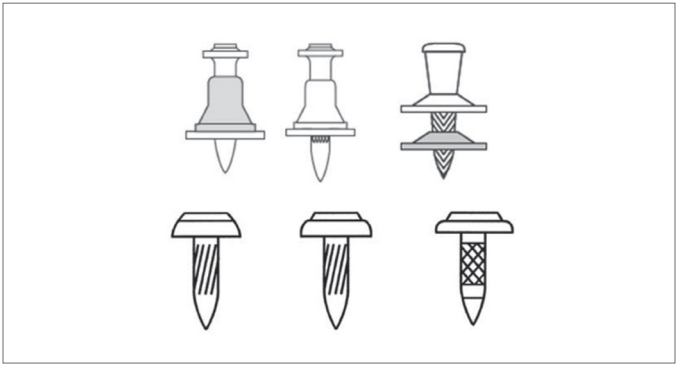
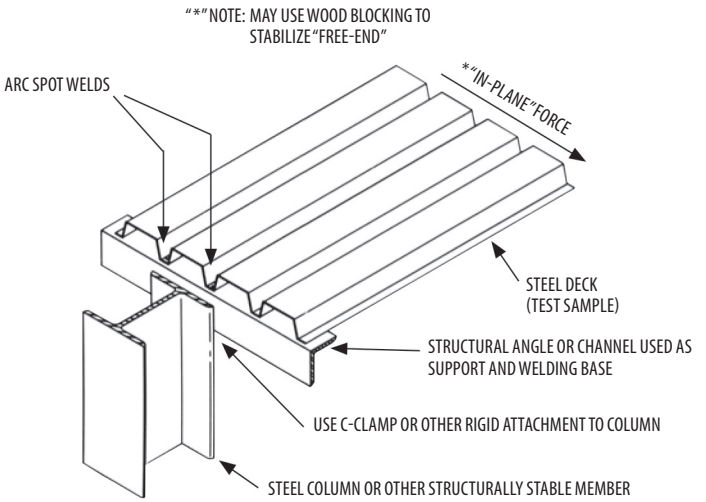


FIGURE 6C - EXAMPLES OF POWER-ACTUATED FASTENERS

Welding

Welding must be done by a qualified welder during proper weather conditions. Quality welding of deck requires experience and the selection of proper amperage and electrodes. A weld quality control test procedure is shown in Figure 7. All welding should be done in accordance with the Structural Welding Code, AWS D1.1 or D1.3. Weld washers are not recommended for deck thicknesses of 0.028 inches thick (minimum 22 gage) and greater. Weld washers are required for metal thicknesses less than 0.028 inches. Proper welding requires good metal to metal contact; therefore, lapping composite deck sheets with embossments is not recommended. For the same reason, built in hanger tabs (in floor deck) that bear on structural steel should be flattened or removed.

FIGURE 7
WELD QUALITY CONTROL TEST PROCEDURE



A preliminary check for welding machine settings and operator qualifications can be made through a simple field test by placing a pair of welds in adjacent valleys at one end of a panel. The opposite end of the panel can then be rotated, which places the welds in shear. Separation leaving no apparent external weld perimeter distresses, but occurring at the sheet to structure plane; may indicate insufficient welding time and poor fusion with the substrate. Failure around the external weld perimeter, showing distress within the panel but with the weld still attached to the substrate, would indicate a higher quality weld.

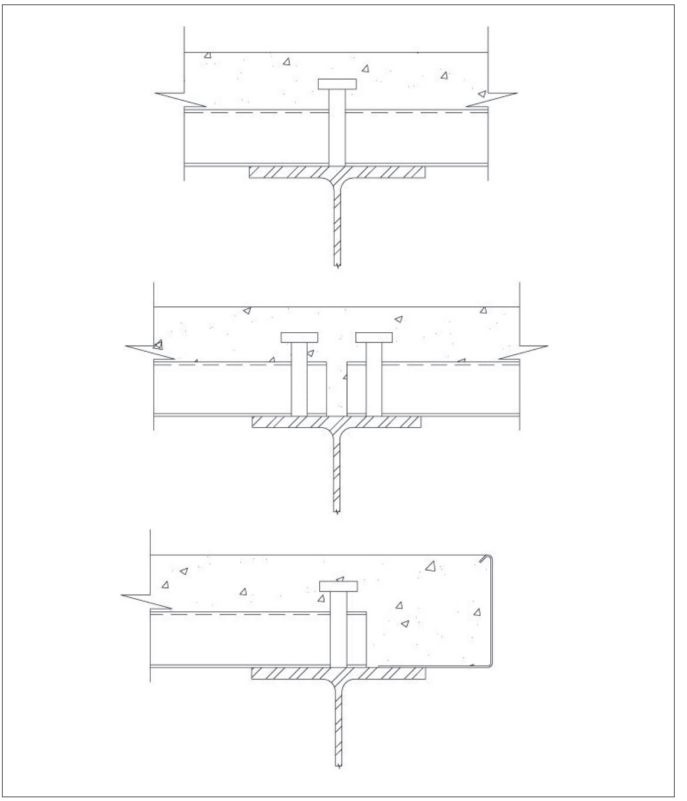
Shear Studs

Shear studs, welded in place with special equipment (in accordance with AWS D1.1) can serve as welding to hold the deck to the frame when installed as shown in Figure 8. These studs are usually installed after the deck has been spread to act as a working platform. Therefore, it is necessary that the platform be adequately attached to the structure before the studs are installed.

Shear studs can be welded through the double metal thickness of cellular deck. Note: If the deck is heavier than 16 gage the stud manufacturer should be consulted for installation procedures. Shear studs, like all other fasteners, must be installed in accordance with the design drawings.

Since most construction work is done in open air, ventilation for welding is usually adequate. However, for closed in areas, ventilation must be provided. Adequate ventilation is extremely important when welding galvanized deck. All workers involved in the welding operation must wear eye protection to avoid weld flash.

FIGURE 8
EXAMPLES OF PROPER DECK ATTACHMENT WITH STUDS



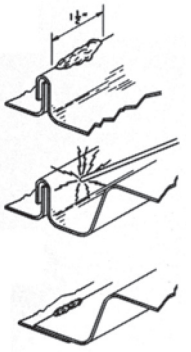
Side Lap Connections

Sheet to sheet connections may be required at the side laps of deck. These are frequently referred to as stitch connections. Self drilling screws, welds, clinching or button punches are the usual stitch connections. Stitch screws are usually self drilling type; #8's through 1/4 inch diameter can be used but screws smaller than #10 diameter are not recommended. The installer must be sure that the underlying sheet is drawn tightly against the top sheet. Again, as when screws are used as the frame attachment, the special screw driving guns are used to prevent over torquing.

Manual button punching of side laps requires a special crimping tool. Button punching requires the worker to adjust his weight so the top of the deck stays level across the joint. Since the quality of the button punch attachment depends on the strength and care of the tool operator, it is important that a consistent method be developed. Automatic power driven devices are also used.

Good metal to metal contact is necessary for good side lap welds. Burn holes are the rule rather than the exception and an inspector should not be surprised to see them in the deck. The weld develops its strength by holding around the perimeter. A good weld will have 7/8th's or more of its perimeter working. On occasion, side lap welds will be specified for deck that has the button punchable side lap arrangement (see Figure 9A for comments on this subject; see Figures 9B and 14 for welding these deck sheets to the frame). Welding side laps is not recommended for 22 gage decks (0.028 inch minimum) or lighter. Weld washers should never be used at side laps between supports. Just as when welding to the frame, adequate ventilation must be available and welding near combustibles is prohibited.

FIGURE 9A
SIDE LAP WELDS BETWEEN SUPPORTS



THIS MAY BE A DIFFICULT WELD TO MAKE. THE UPSTANDING LEG MUST BE CAUGHT BY THE WELD.

WELDING FROM THE SIDE (AFTER CLINCHING METAL) CAN BE ACCOMPLISHED IF RIB DOES NOT INTERFERE WITH ROD.

BUILDING A FILLET ON DECK LIGHTER THAN 20 GAGE IS DIFFICULT. TWO SPOT WELDS WOULD BE EASIER AND WOULD PROBABLY BE JUST AS EFFECTIVE.

FIGURE 9B
SIDE LAP WELDS AT SUPPORTS

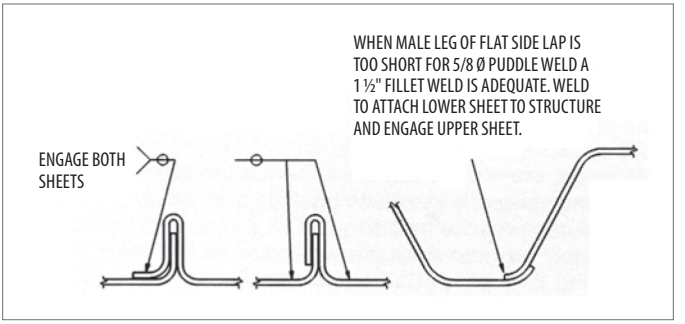
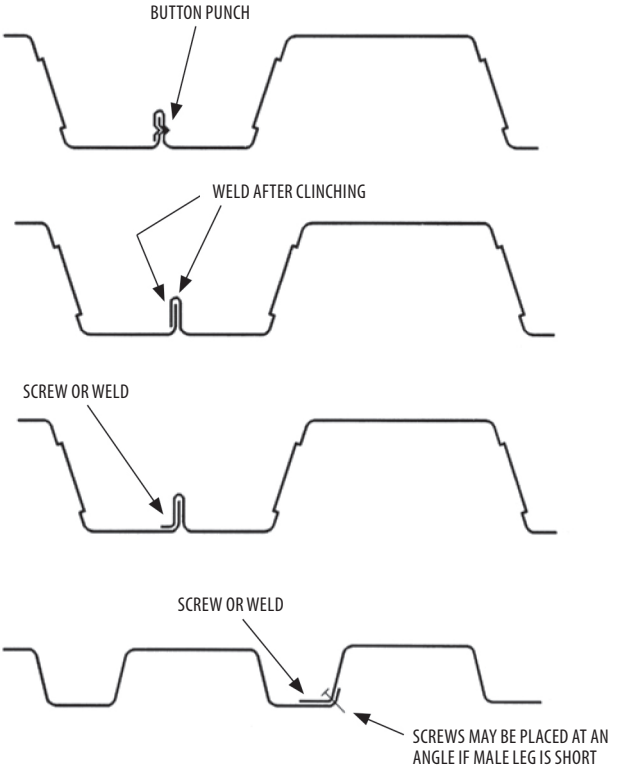


FIGURE 9C
SIDE LAP CONNECTIONS



NOTE: Several manufacturers have developed proprietary crimping tools. Some of these tools pierce the vertical legs at the interlocking side lap connections. These side lap connections are permitted. Refer to manufacturer's reports and literature for additional information.

Housekeeping

Bundling straps, wood dunnage, and deck cut offs should be collected and removed from the working platform daily so as not to create a safety hazard underfoot. Loose tools should not be left lying about. Stud welding ferrules should be broken off of the studs. All debris must be removed from floor deck before concrete is poured.

All parties concerned with the construction process should cooperate to properly store combustible material and remove trash that can be a fire hazard.

Absolutely no loose deck sheets should be left at the end of the working day. Any partially used bundles must be tightly secured to prevent blow off.

Welding should not be done near any type of combustible material. Cutting and welding sparks can cause construction fires. Conditions at a construction site are subject to rapid change. Welding may be safe in a given area and then, because combustibles are introduced, the area is suddenly not safe. The General Contractor (job supervisor) should prevent other trades from storing combustibles near or under areas where welding is to be done. Constant alertness in and below the general area is mandatory.

Fastening steel deck by welding.

Damage to deck and purposeful penetrations have much in common: their location and severity are seldom known beforehand. Usually the designer knows the general area where a vent stack may cut the roof, or approximately where a telephone conduit may pierce the slab; but he may not know how big the hole will be. This lack of information makes it difficult to advise how holes should be reinforced, if at all, or how damaged deck should be repaired. Guide specifications reflect this lack of specific knowledge. The SDI Short-Form Specifications state, "Trades that subsequently cut unscheduled openings through the deck are responsible for reinforcing the openings." The design professional should be consulted for reinforcing requirements.

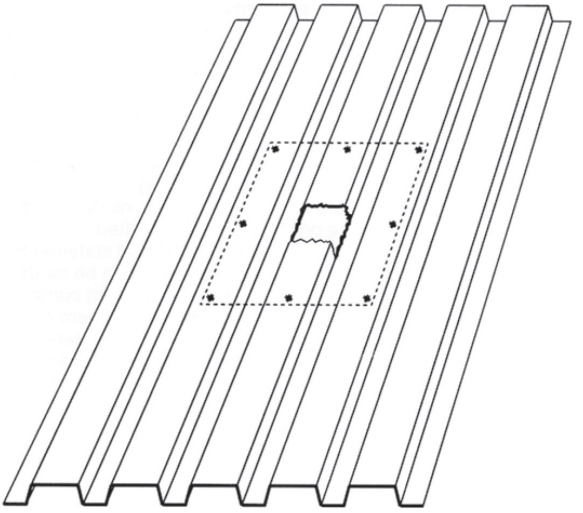
Deck damage presents similar problems. Broad statements such as, "All damaged deck must be replaced," can be made. The designer must then make the decision as to what constitutes damaged deck while considering how replacement may delay the job. How much damage can be tolerated depends on architectural and structural considerations. If the underside of the deck is exposed to public view, very little visible damage may be allowed. In most cases, however, the deck will be hidden by a ceiling or ducts and utilities and the usual concern is about structural performance.

Roof Deck

For most 1 1/2" roof decks the loss of one rib per sheet, either by severe denting or penetration, may be tolerated. No reinforcing may be required for an opening of 6" as long as not more than two webs are removed. Refer to Figure 10. In most cases the capacity of the deck is greater than required for roof loads as long as the remaining percentage of ribs in the deck panel have sufficient remaining capacity. For instance, a 36" wide panel of WR deck has 12 webs (6 flutes). If 2 webs (1 flute) are removed, the allowable capacity multiplied by 5/6 can be compared to the required load capacity. One 6" diameter hole per sheet in a span should not adversely affect the diaphragm strength and a dent can be larger than 6" and still carry the diaphragm load. Covering a dent or an 8" maximum hole diameter or width with a 0.045" plate and extending the plate to adjacent ribs could eliminate worries about insulation board spanning the damage and about a "soft spot" in the roof. For dents or holes greater than a rib (over 8" to 13" diameter or width), it is advisable to use a 0.057" minimum plate. Exceptions to this recommendation are:

1. the hole may be located in such a place that the deck can safely cantilever from each adjacent support;
2. a group of holes may be so close together that a structural frame is required.

FIGURE 10
EXAMPLE OF 6" HOLE OR DENT



Typical Reinforcement Schedule:

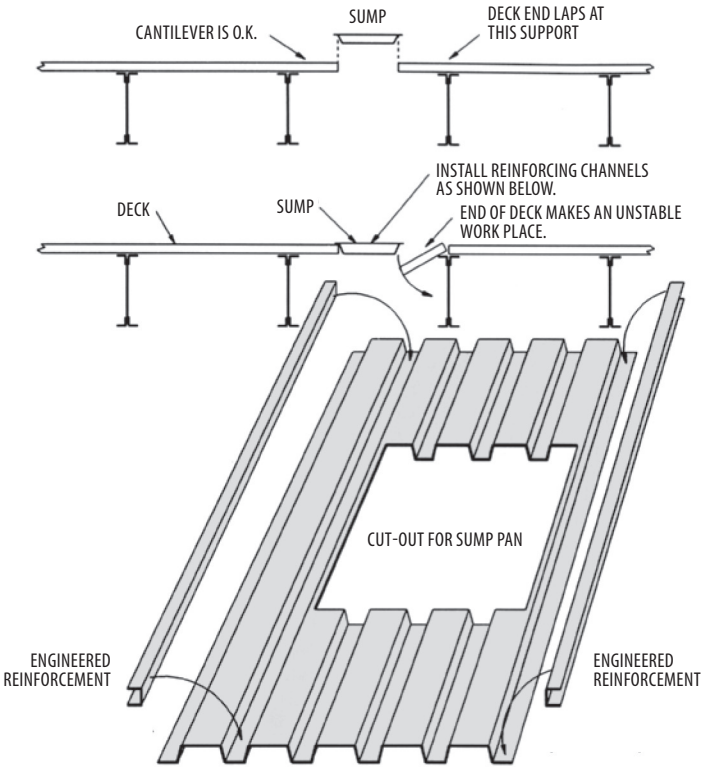
Diameter or Width of Damage or Hole	Required Reinforcement
< = 6"	No Reinforcing Or 0.045" Plate (Min.)
< = 8"	0.045" Plate (Min.)
< = 13"	0.057" Plate (Min.)
> 13"	Design By Project Engineer

NOTE:
This schedule is intended to address situations that are often encountered under normal jobsite conditions and does not restore full structural load carrying performance in all circumstances.

Sump Pans

A special case of roof penetration is the sump pan. When properly attached, the sump pan will carry the load of the deck it replaces. It also acts as a small header to transfer loads into adjacent uncut sheets. Approximate sump pan analysis methods are shown in the *SDI Roof Deck Design Manual*; a reinforcing technique is shown in Figure 11.

FIGURE 11
SUMP REINFORCING AT END OF DECK



Put 1 ½" deep reinforcing channels in each rib at each side of opening (flush with top of deck). Channels span between joists. Attach flanges of sump pan to channels.

Burn holes in deck side laps, caused by welded side lap attachments, are spaced far enough apart not to cause problems. Burn holes near intermediate supports are unlikely to cause much loss of strength unless a total area greater than a 6" diameter hole is removed. These burn holes are usually caused by the welder searching for the unseen structural member; therefore the use of chalk lines is recommended.

Distributed small dents, such as those caused by foot traffic, will not cause a structural problem; but if the denting covers a large percentage of the job, the insulation board will be better attached with mechanical fasteners rather than by adhesives. The design professional must approve any change in fastening.

Vigilance should be maintained to detect and correct any "soft" spots in roofs that could cause insulation boards to crack under foot loading.

Floor Deck

Before concrete is poured, the contractor should inspect the deck to find any areas that may be damaged or crushed which may require shoring for the concrete pour. Areas that buckle during the pour are usually caused by previous damage, over spanning the deck, or allowing concrete to pile up. Buckled areas do not adversely affect the live load capacity. Tests at West Virginia University, by Dr. Larry Luttrell, showed no loss in live load capacity when the deck was purposely buckled.

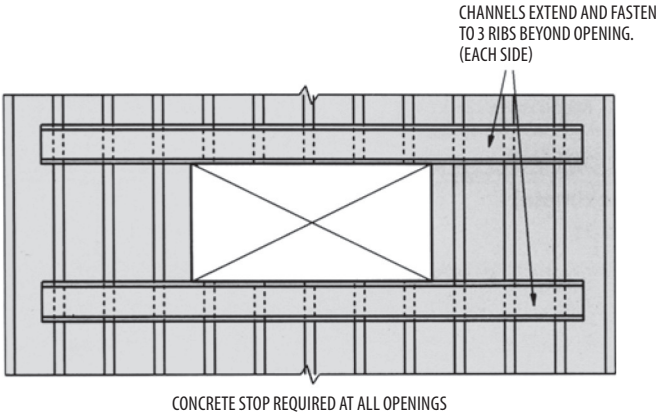
Since floor deck damage or penetration can affect the deck's capacity to carry concrete, any floor deck damage or penetration must be evaluated prior to pouring concrete. Floor deck, like roof deck, can be examined as a cantilever. However the SDI does not publish a cantilever table for floor deck because of the great profile variations available. The deck manufacturer should be contacted for permitted cantilever spans. A preferred forming method is to block out concrete from where a penetration will occur; and, after the concrete sufficiently cures, burn the deck away. The design professional determines the need for additional bars or welded wire reinforcement around the block out.

It is the responsibility of the design professional to designate holes/openings to be decked over in compliance with OSHA Regulation 29 CFR Section 1926.754(e)(2)(2003). When a hole/opening is not shown and dimensioned on the structural design drawings, no provisions for concrete retainage will be provided. When a decked over floor hole/opening is dimensioned **and** light-gage closures are specified on the structural design drawings, the deck manufacturer may provide the closures. Figure 13 shows examples of closures that can be used for concrete retainage around a decked over opening.

The deck should be inspected for adequate attachment at supports and at side laps. Side laps must be tightly connected to prevent opening during concrete pouring.

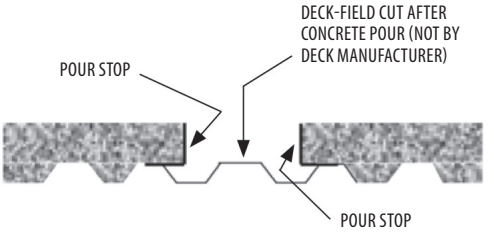
Concrete provides an alkaline environment that discourages corrosion. Since most applications of composite deck are in dry interior areas, field painting of burned, cut or abraded areas is not usually required. Any touch up requirements must be provided in the job specifications since the design professional establishes the deck finish required for the environment.

FIGURE 12
DETAILS FOR OPENINGS TO 24" PERPENDICULAR TO DECK



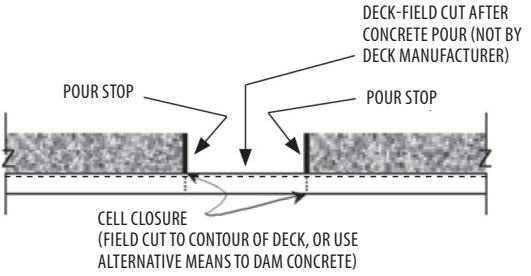
NOTE: Detail is conceptual and must be designed by the designer of record for the specific application.

FIGURE 13
DECKED OVER FLOOR OPENING CLOSURE EXAMPLES



CLOSURE AT DECK IN WEAK DIRECTION

(ALL CLOSURES TO BE FIELD CUT FROM 10' LENGTHS)



CLOSURE AT DECK IN STRONG DIRECTION

VIII. PLACING CONCRETE

After the composite floor deck (or form deck) has been properly installed, it acts as a working platform for many trades. In accordance with SDI Standards, the deck should have been selected to provide at least fifty pounds per square foot capacity as a working platform. If the contractor anticipates loads on the platform that will exceed 50 psf, he should take appropriate steps to ensure the deck will carry the load.

Before concrete is poured, the contractor should make sure that the deck is properly and completely fastened in accordance with approved deck erection drawings and the deck has adequate bearing on all supports. Damaged areas must be repaired or accepted. All ferrules should have been broken off the studs. All dirt and debris must be removed. All reinforcement, wires or rods, should be securely in place. The concrete contractor should review the deck shoring requirements and make sure that shores are securely in place.

Concrete should be poured from a low level to avoid impacting the deck. It should be placed uniformly over the supporting structure and spread towards the center of the deck span. Concrete should be placed in a direction so that the weight is first applied to the top sheet at the side lap, reducing the possibility of the side opening during the pour. Workers should not congregate around the concrete placement zone. If buggies are used to place the concrete, runways should be planked and the buggies should only operate on the planking. The planks should be stiff enough to transfer the buggy loads without damaging the deck. Deck damage caused by roll bars or careless placement must be avoided.

Because pouring room can be restricted, special consideration is required for single span conditions. For example, a single span condition commonly occurs between elevator shafts, and it is likely that concrete placement will be less controlled. Although deck connections are important for all span conditions, they are extremely important for single spans. Connections should be thoroughly checked.

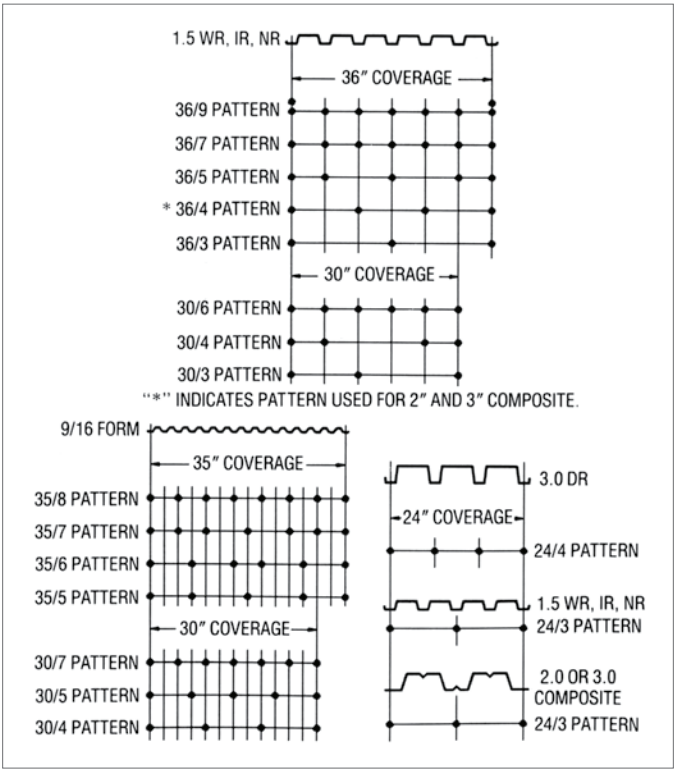
As concrete is placed, the entire frame as well as the deck will deflect. Concrete quantities should be calculated with all deflections taken into account. Refer to the SDI Floor Deck Design Manual (FDDM) for further information. The weight of concrete finishing equipment will also affect the capacity of the deck as a working platform. For example, heavy equipment suitable for use to finish slabs on grade will generally not be suitable to finish elevated concrete slabs supported by steel deck.

IX. SPECIAL CONSIDERATIONS FOR DIAPHRAGMS

When the deck has been designed to act as a shear diaphragm, it should be noted on the record drawings. The note should caution that the deck panels act as bracing for the building and that removing any of the panels is prohibited unless separate bracing is designed and provided. Deck fasteners used around framed openings should be the same as, and their spacing equal to or closer than, the fasteners used to attach the deck to the frame unless otherwise detailed.

If the deck is to act as a diaphragm during construction, it must be realized that the diaphragm is not effective until all deck sheets are in place and fully connected. Therefore, if deck erection is interrupted before completion, temporary bracing may be required.

FIGURE 14 - FRAME CONNECTION LAYOUTS
Connections may be arc puddle welds, screws, powder-actuated or pneumatically driven fasteners.



X. QUALITY CONTROL AND QUALITY ASSURANCE

Quality in the installation of steel deck is of utmost importance in obtaining a satisfactory project. This excerpt from the SDI QA/QC-2017; "Standard for Quality Control and Quality Assurance for Installation of Steel Deck" is provided here for quick reference. The entire Standard should be consulted.

APPENDIX 1. TABLES OF INSPECTION OR EXECUTION TASKS

"Observe" shall mean to inspect these items on an intermittent basis. Operations need not be delayed pending these inspections. Frequency of observations shall be adequate to confirm that the work has been performed in accordance with the applicable documents. In the event that observations determine that the materials and/or workmanship are not in conformance with the applicable documents, additional inspections shall be performed to determine the extent of non-conformance.

"Perform" shall mean to perform these tasks prior to final acceptance for each item or element.

Within the listed tasks, "Document" shall mean the inspector shall prepare reports or other appropriate written documentation indicating that the work has or has not been performed in accordance with the construction documents.

User Note: The scope of inspections contained in Appendix 1 is considered to be adequate for most installations. At the option of the Designer or AHJ, the scope of inspections may be increased for specific structures or conditions.

TABLE 1.1
INSPECTION OR EXECUTION TASKS PRIOR TO DECK PLACEMENT

	Task	QC	QA
A	Verify compliance of materials (deck and all deck accessories) with construction documents, including profiles, material properties, and base metal thickness	Perform	Perform
B	Document acceptance or rejection of deck and deck accessories	Perform	Perform

TABLE 1.2
INSPECTION OR EXECUTION TASKS AFTER DECK PLACEMENT

	Task	QC	QA
A	Verify compliance of deck and all deck accessories installation with construction documents	Perform	Perform
B	Verify deck materials are represented by the mill certifications that comply with the construction documents	N/A	Perform
C	Document acceptance or rejection of installation of deck and deck accessories	Perform	Perform

TABLE 1.3
INSPECTION OR EXECUTION TASKS PRIOR TO WELDING

	Task	QC	QA
A	Welding procedure specifications (WPS) available	Observe	Observe
B	Manufacturer certifications for welding consumables available	Observe	Observe
C	Material identification (type/grade)	Observe	Observe
D	Check welding equipment	Observe	Observe

TABLE 1.4
INSPECTION OR EXECUTION TASKS DURING WELDING

	Task	QC	QA
A	Use of qualified welders	Observe	Observe
B	Control and handling of welding consumables	Observe	Observe
C	Environmental conditions (wind speed, moisture, temperature)	Observe	Observe
D	WPS followed	Observe	Observe

TABLE 1.5
INSPECTION OR EXECUTION TASKS AFTER WELDING

	Task	QC	QA
A	Verify size and location of welds, including support, sidelap, and perimeter welds	Perform	Perform
B	Welds meet visual acceptance criteria	Perform	Perform
C	Verify repair activities	Perform	Perform
D	Document acceptance or rejection of welds	Perform	Perform

TABLE 1.6
INSPECTION OR EXECUTION TASKS PRIOR TO MECHANICAL FASTENING

	Task	QC	QA
A	Manufacturer installation instructions available for mechanical fasteners	Observe	Observe
B	Proper tools available for fastener installation	Observe	Observe
C	Proper storage for mechanical fasteners	Observe	Observe

TABLE 1.7
INSPECTION OR EXECUTION TASKS DURING MECHANICAL FASTENING

	Task	QC	QA
A	Fasteners are positioned as required	Observe	Observe
B	Fasteners are installed in accordance with manufacturer's instructions	Observe	Observe

TABLE 1.8
INSPECTION OR EXECUTION TASKS AFTER MECHANICAL FASTENING

	Task	QC	QA
A	Check spacing, type, and installation of support fasteners	Perform	Perform
B	Check spacing, type, and installation of sidelap fasteners	Perform	Perform
C	Check spacing, type, and installation of perimeter fasteners	Perform	Perform
D	Verify repair activities	Perform	Perform
E	Document acceptance or rejection of mechanical fasteners	Perform	Perform

REFERENCES

1. **American Welding Society (AWS)**
   a. AWS B5.1, Specification for the Qualification of Welding Inspectors
   b. AWS D1.1, Structural Welding Code-Steel
   c. AWS D1.3, Structural Welding Code-Sheet Steel

2. **Steel Deck Institute (SDI)**
   a. SDI C, Standard for Composite Steel Floor Deck-Slabs
   b. SDI NC, Standard for Noncomposite Steel Floor Deck
   c. SDI RD, Standard for Steel Roof Deck
   d. SDI QA/QC, Standard for Quality Control and Quality Assurance for Installation of Steel Deck
   e. SDI Roof Deck Design Manual (RDDM)
   f. SDI Floor Deck Design Manual (FDDM)
   g. SDI Diaphragm Design Manual (DDM04)
   h. SDI COSP, Code of Standard Practice
   i. SDI Short Form Specifications (Roof Deck, Form Deck, Composite Deck)
   j. SDI White Paper, "Jobsite Storage Requirements for Steel Deck"
   k. SDI White Paper, "Damaged Composite Steel Deck"
   l. SDI White Paper, "Deck Damage and Penetrations"
   m. SDI White Paper, "Fundamentals of Corrosion and Their Application to Steel Deck"

3. **American Institute of Steel Construction (AISC)**
   a. AISC Steel Construction Manual

4. **Steel Joist Institute (SJI)**
   a. Technical Digest No. 9, Handling and Erection of Steel Joists and Joist Girders

5. **Steel Coalition Lubricant Task Group**
   a. "Steel Coalition Lubricant Task Group – Final Report", May 14, 2002 (Available through SDI website)

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