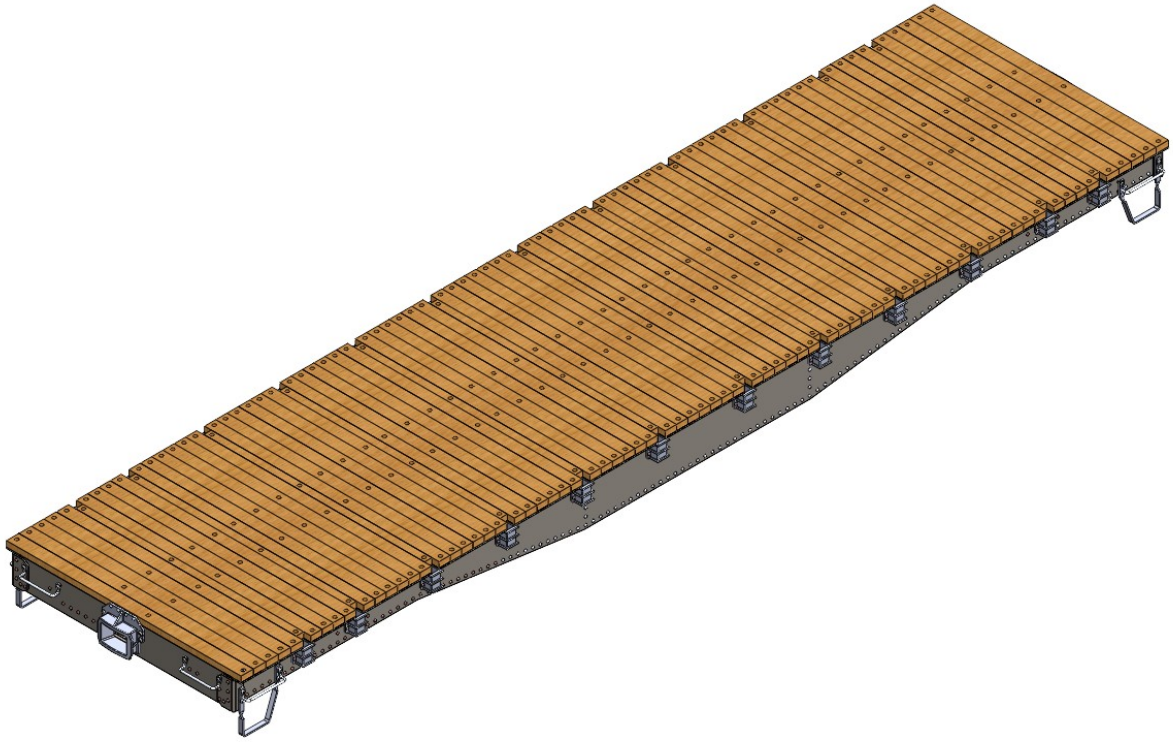
SOUTHERN PACIFIC 41' FLAT CAR KIT FOR 1:12 SCALE



INSTRUCTION MANUAL

PACIFIC DESIGN SHOPS

REVISION: A
REVISION DATE: 10/21/22

KIT OVERVIEW

Tools you may need to assemble the kit:

- Welder
- Grinder
- Clamps
- Rivet squeezer or rivet gun
- Squeezer dies, air hammer bits or bucking bar
- 1/16" Clecos (minimum 2 needed) & cleco pliers
- Cordless Drill
- 1/16" drill bits
- 2-56 Tap and #50 drill bit

Extra materials you may need (see page 4 for list of hardware):

- Trucks
- Couplers
- Truck and coupler mounting hardware
- Safety chain mounts
- Paint
- Decals

Common acronyms:

- BOM - Bill of Material
- PDS - Pacific Design Shops
- RRS - 1" Railroad Supply
- MMC - McMaster Carr
- HRS - Hanson Rivet & Supply Co.

Helpful Tips

- Assemble kit together before welding to see how the parts go together.
- Tack weld the pieces together. It is easier to undo a tack than a bead.
- When applying the finishing welds, use skip welds instead of a continuous welding to avoid extreme warping and twisting.
- Weld from one end to the other to avoid warping.
- Use clamps to keep joints tight together when welding.

See the FAQ page for more helpful tips and answers to commom questions.

We want your feedback! If you see an area to improve either on the kit or the instructions, please let us know. Send your feedback to info@pacificdesignshops.com.

**PACIFIC DESIGN SHOPS IS NOT RESPONSIBLE FOR DEFECTS RESULTING FROM POOR ASSEMBLY OR CARELESS HANDLING.
REPLACEMENT PARTS MAY BE AVAILABLE TO PURCHASE.**

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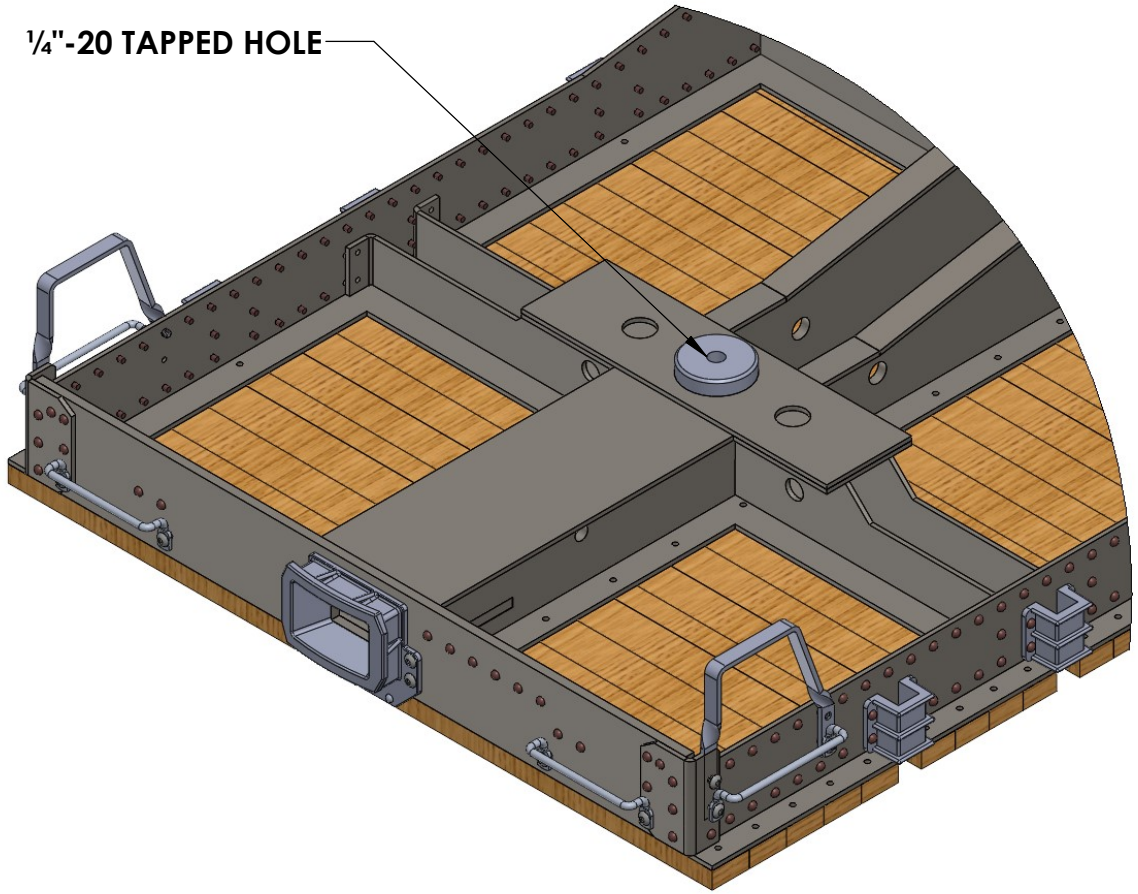
TRUCK MOUNTING OVERVIEW

1" Railroad Supply: Assembly is completed with steel bolster already tapped for 1/4"-20. Use standard shoulder screw with truck to attach to frame.

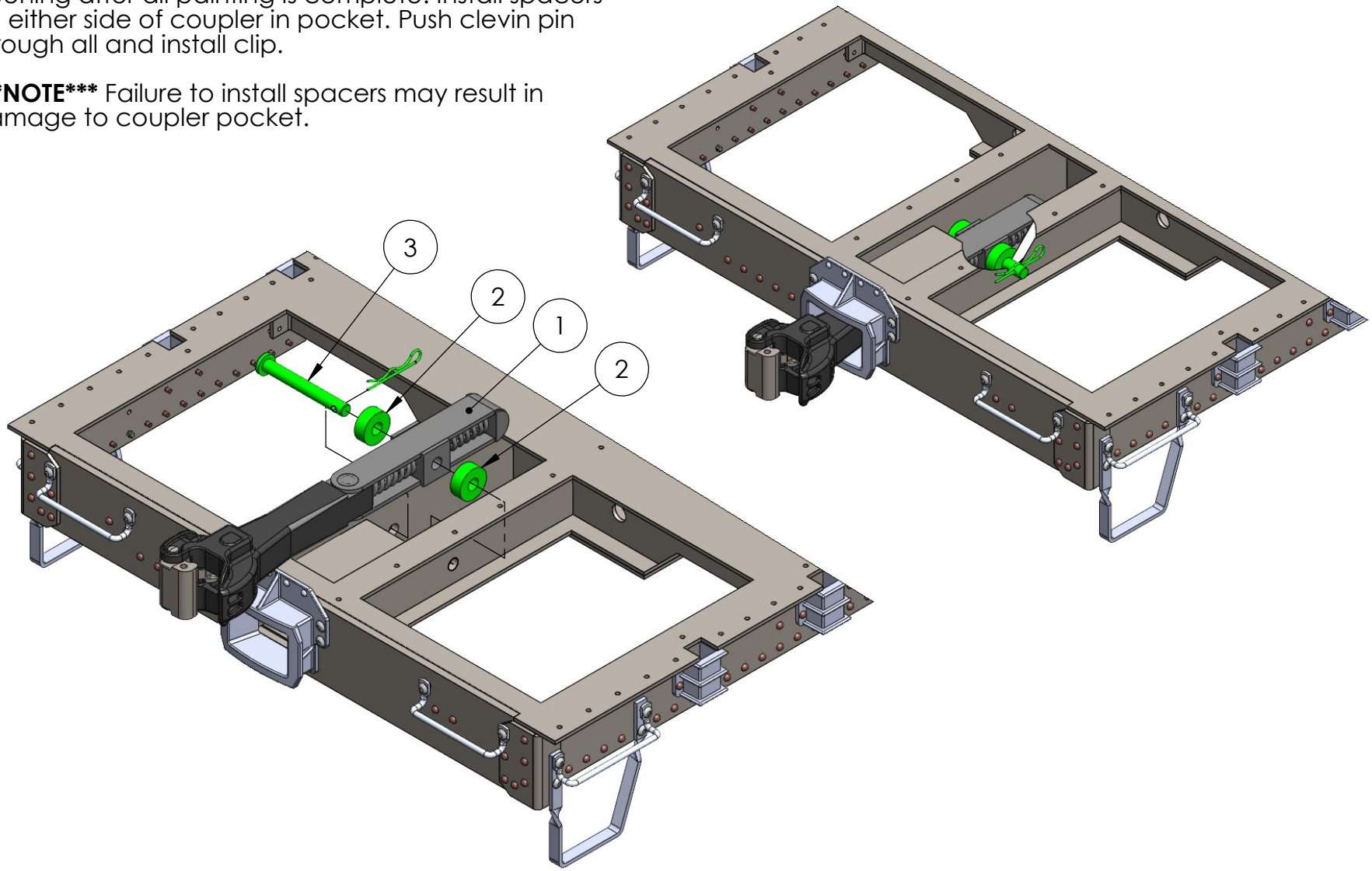


COUPLER MOUNTING OVERVIEW

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	RRS_2400	Coupler w/ Draft Gear	1
2	MMC_92510A741	Aluminum Spacer, ½" OD x 3/16"	2
3	MMC_97245A613	Clevis Pin, 3/16" x 1-5/16"	1

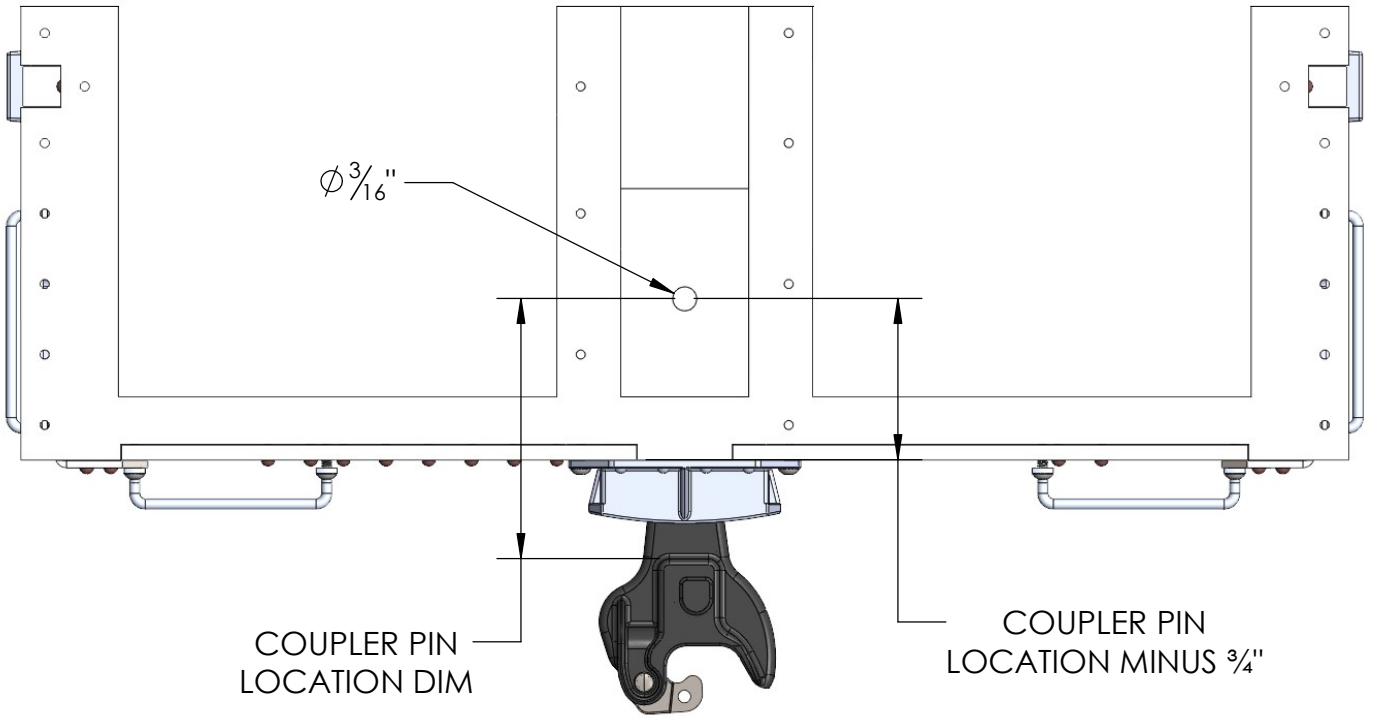
Sprung Coupler: Cross hole for sprung couplers is standard on design. Assemble coupler per manufacturers instructions and install through front opening after all painting is complete. Install spacers on either side of coupler in pocket. Push clevin pin through all and install clip.

*****NOTE***** Failure to install spacers may result in damage to coupler pocket.



COUPLER MOUNTING OVERVIEW

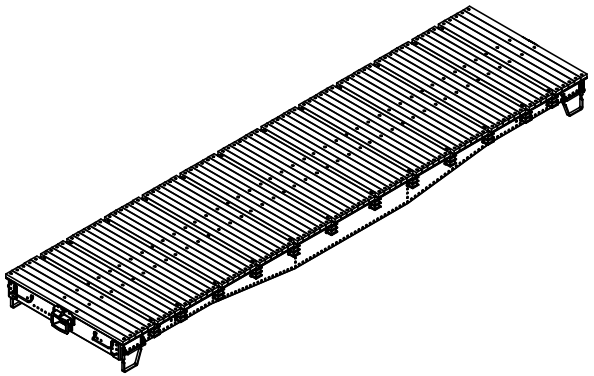
Solid Coupler: Top coupler plate can be drilled for solid coupler mounting. Measure distance from rear face on coupler to coupler mounting hole. Subtract ¾" and mark distance on top coupler pocket per drawing below. Drill through top and bottom plates and install bolt.



BOM OVERVIEW

- Use the BOM's below for pages 5-14
- Items below may be included in kit depending on Tier ordered.
- Rivet part numbers listed below are for copper and can be sourced from Hanson Rivet & Supply Co.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	SPF47_ST11G_A2	Center Frame	2
2	SPF47_ST11G_B2	Tall Center Supports	2
3	SPF47_ST11G_C3	Short Center Supports	3
4	SPF47_ST11G_D2	End Frames	2
5	SPF47_ST11G_E2	Top Coupler Plate	2
6	SPF47_ST16G_A2	Side Frames	2
7	SPF47_ST16G_B4	Bolster Supports	4
8	SPF47_ST16G_C2	Corner A	2
9	SPF47_ST16G_D2	Corner B	2
10	SPF47_ST16G_E1	Top Plate	1
11	SPF47_ST16G_F1	Bottom Plate	1
12	SPF47_ST16G_G2	Bolster Spacer	2
13	SPF47_ST16G_H4	Stirrup Steps	4
14	N/A	Bolster Pin	2



Recommended Copper Rivets

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
15	HRS_35C0202	1/16" x 1/8"L Rivet	412
16	HRS_35C0203	1/16" x 3/16"L Rivet	136
17	HRS_35C0204	1/16" x 1/4"L Rivet	24

Recommended Detail Parts

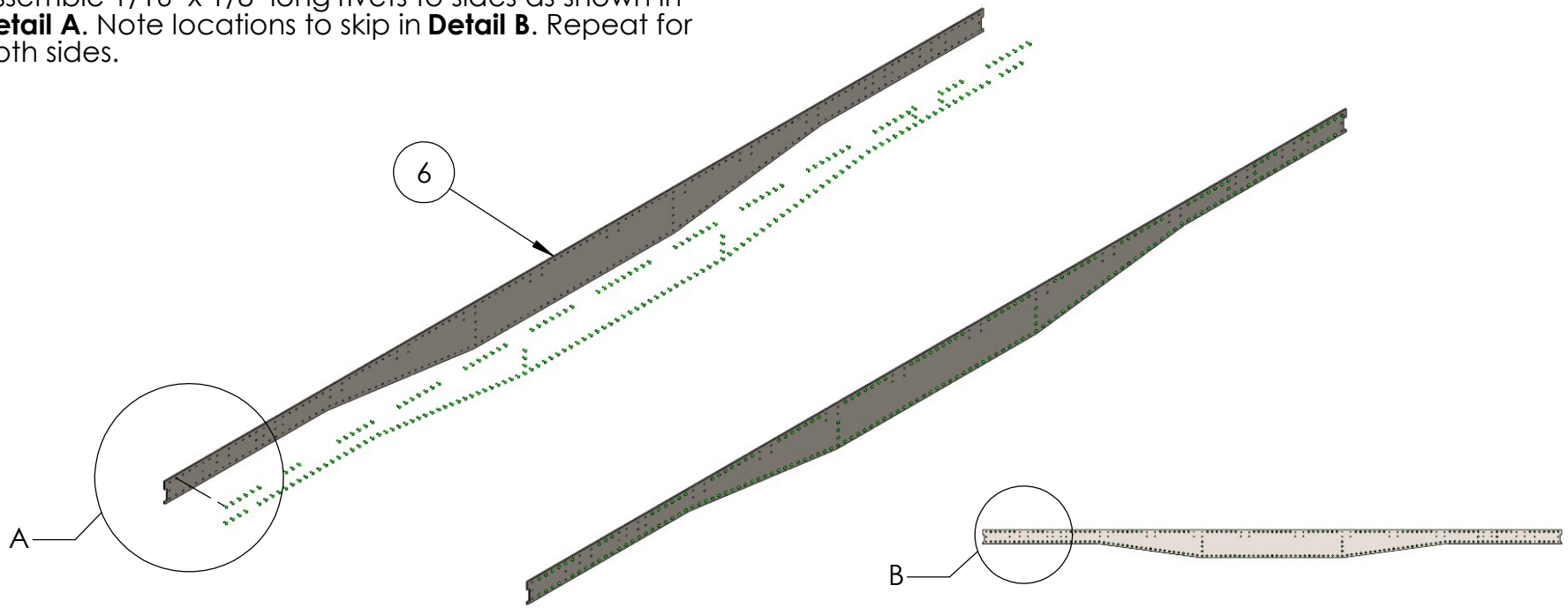
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
18	RRS_2350	Flat Car Stake Pocket	24
19	RRS_8265	Single Drop Grabiron 1½"	4
20	N/A	Single Drop Grabiron 1.66"	4
21	N/A	Deck Boards	1
22	N/A	Coupler Pocket	2

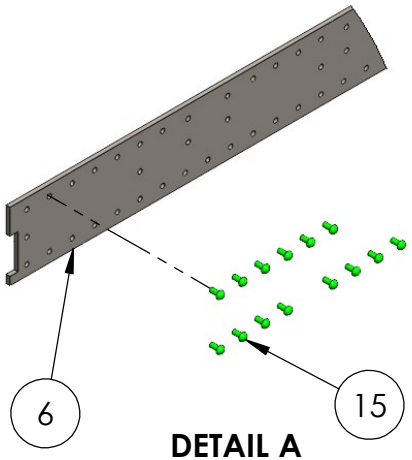
Recommended Hardware

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
23	MMC_92949A076	2-56 x 3/16" BHCS, 18-8 SS	32
25	MMC_91099A107	2-56 x 5/16" CSFH, 18-8	255

STEP 1: RIVETING SIDES

Assemble 1/16" x 1/8" long rivets to sides as shown in **Detail A**. Note locations to skip in **Detail B**. Repeat for both sides.

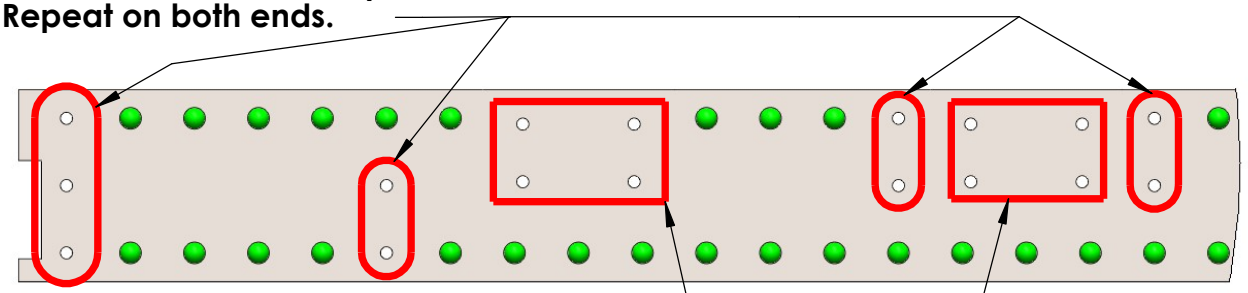




DETAIL A

DETAIL B

Locations of rivets to skip. Repeat on both ends.

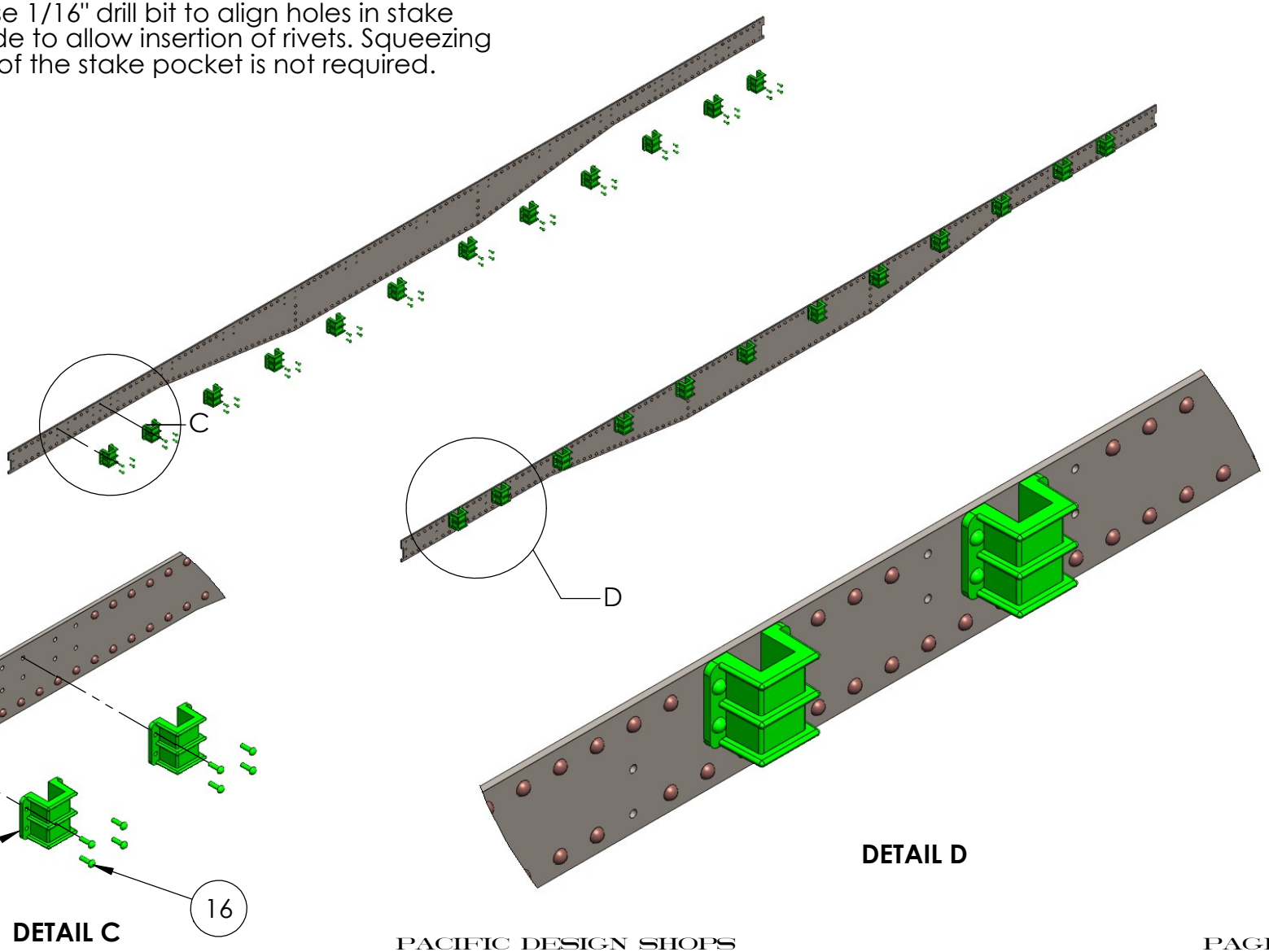


Locations for Stake Pockets. Skip pattern of 4 for all locations.

STEP 2: RIVETING STAKE POCKETS

Assemble stake pockets to sides using 1/16" x 3/16" long rivets as shown in **Detail C** & **Detail D**. Repeat for both sides.

*****NOTE***** Use 1/16" drill bit to align holes in stake pockets to side to allow insertion of rivets. Squeezing or stretching of the stake pocket is not required.

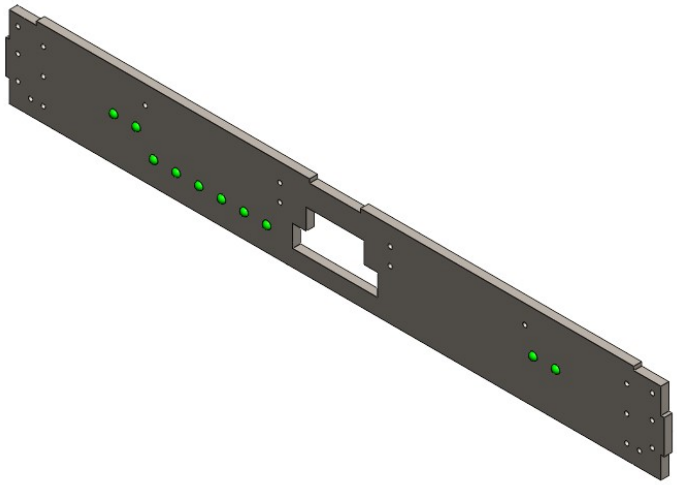


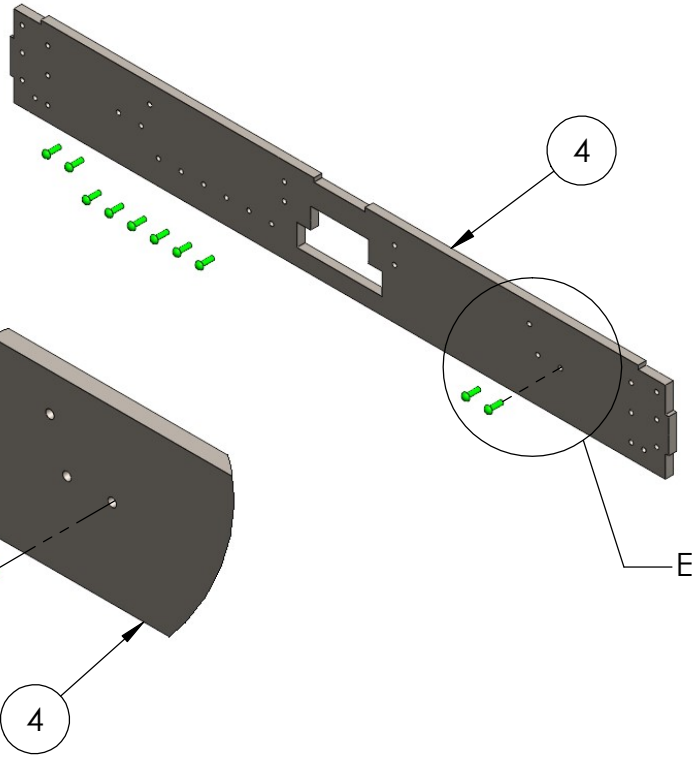
DETAIL C

DETAIL D

STEP 3: RIVETING ENDS

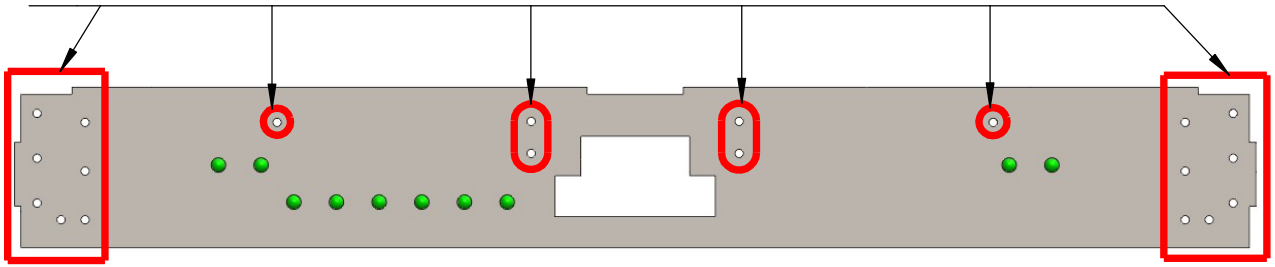
Assemble 1/16" x 3/16" long rivets to ends frames as shown in **Detail E**. Note locations to skip in picture below. Repeat for both ends.





DETAIL E

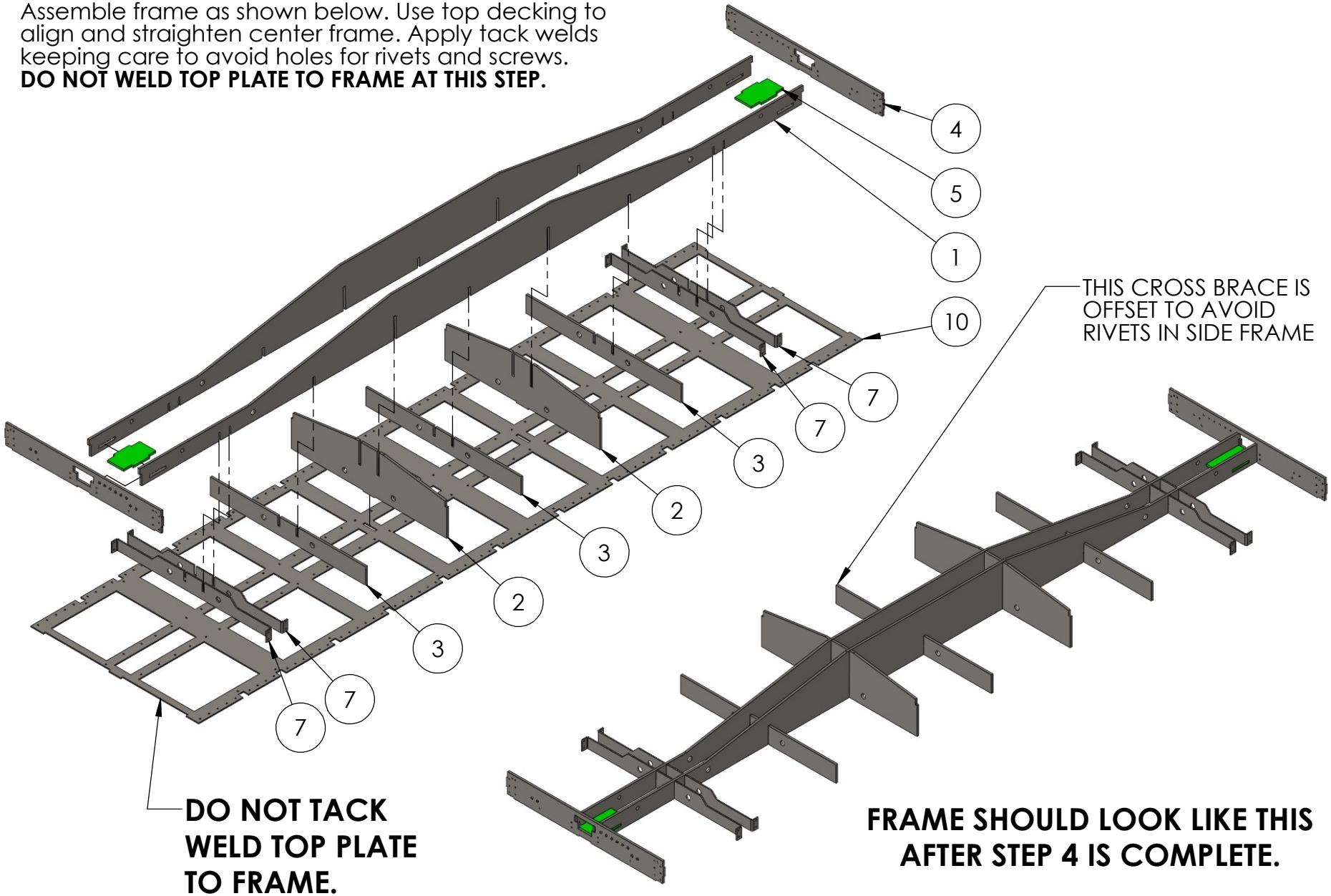
Locations of rivets to skip.



STEP 4: WELDING FRAME

*****TACK WELD ONLY*****

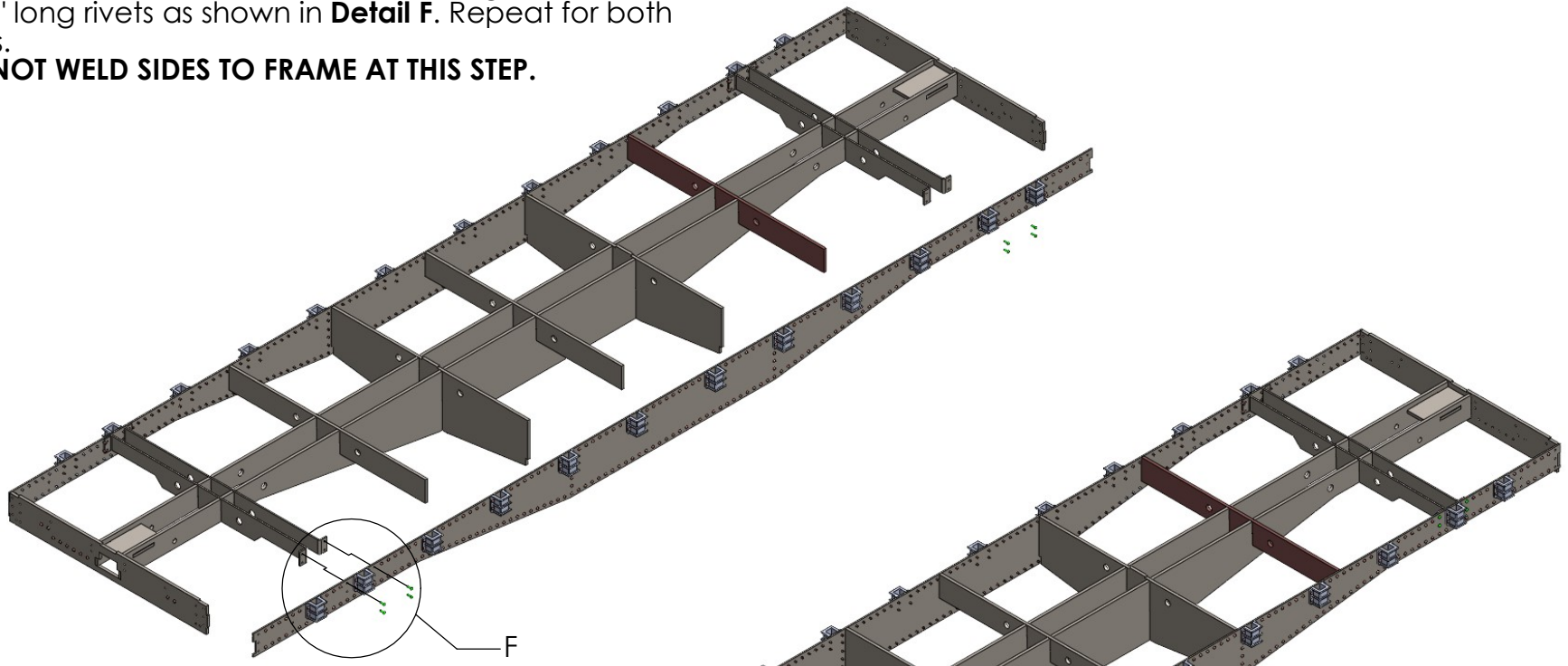
Assemble frame as shown below. Use top decking to align and straighten center frame. Apply tack welds keeping care to avoid holes for rivets and screws.
DO NOT WELD TOP PLATE TO FRAME AT THIS STEP.

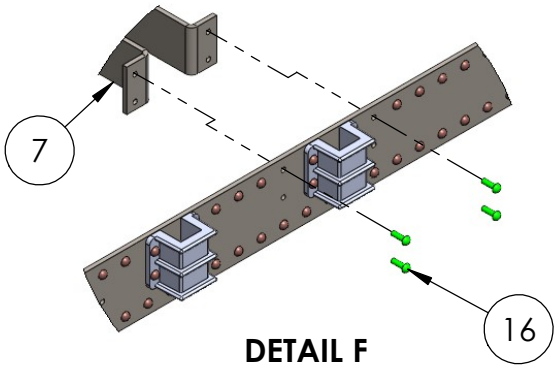


STEP 5: RIVETING SIDES TO FRAME

Assemble side assemblies to frame using 1/16" x 3/16" long rivets as shown in **Detail F**. Repeat for both sides.

DO NOT WELD SIDES TO FRAME AT THIS STEP.

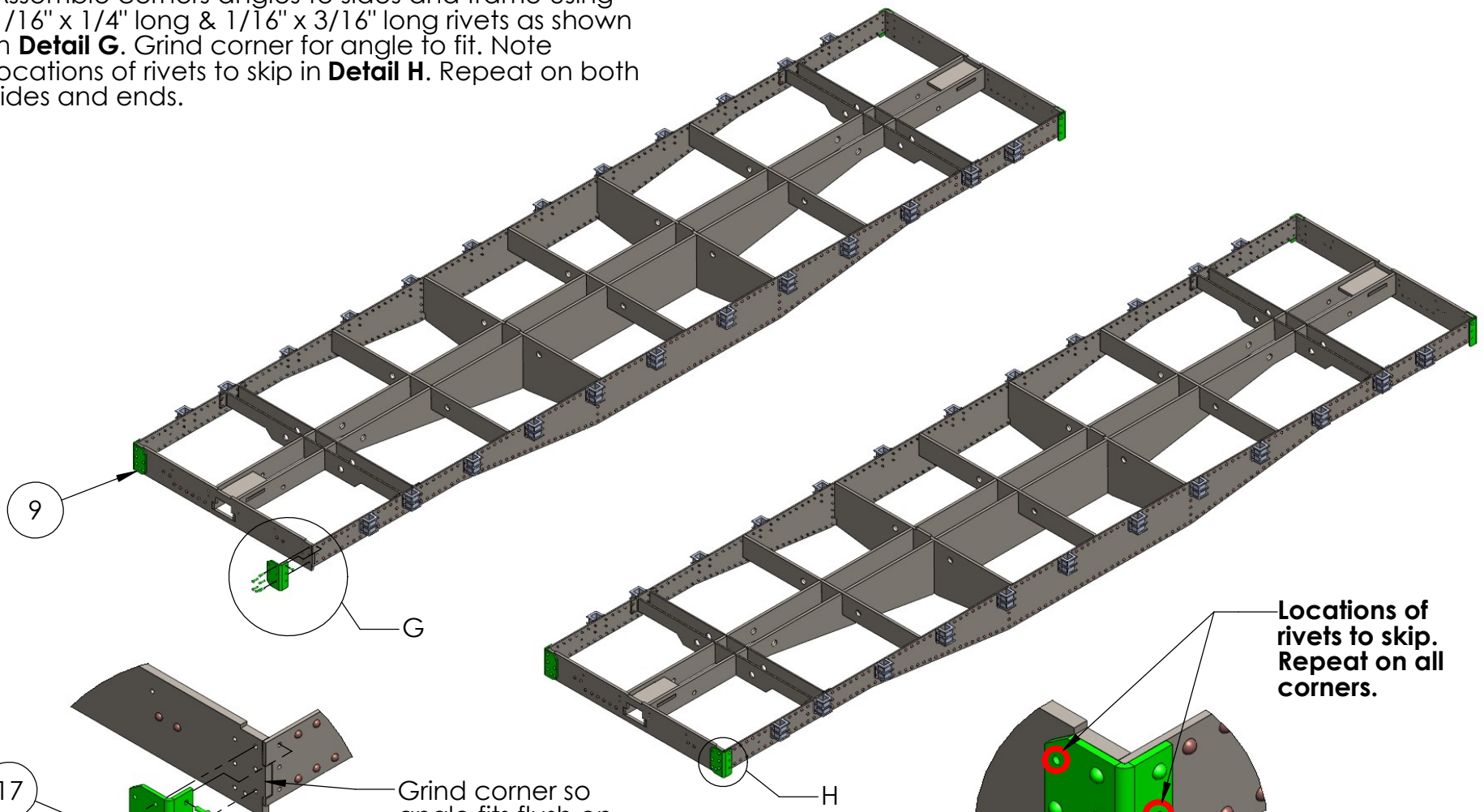


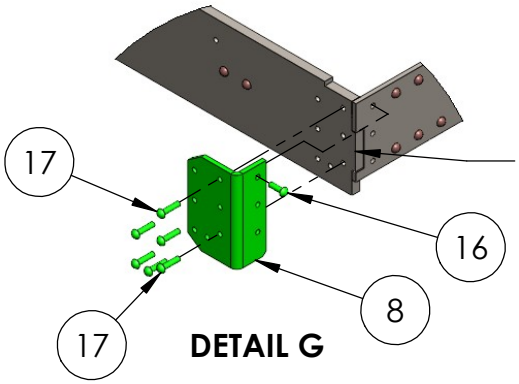


DETAIL F

STEP 6: RIVETING CORNERS

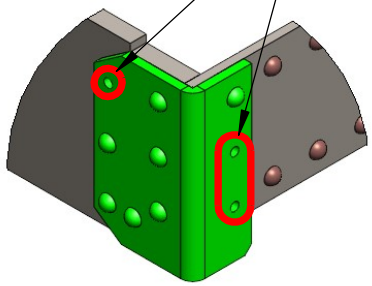
Assemble corners angles to sides and frame using 1/16" x 1/4" long & 1/16" x 3/16" long rivets as shown in **Detail G**. Grind corner for angle to fit. Note locations of rivets to skip in **Detail H**. Repeat on both sides and ends.





Grind corner so angle fits flush on both surfaces.

DETAIL G



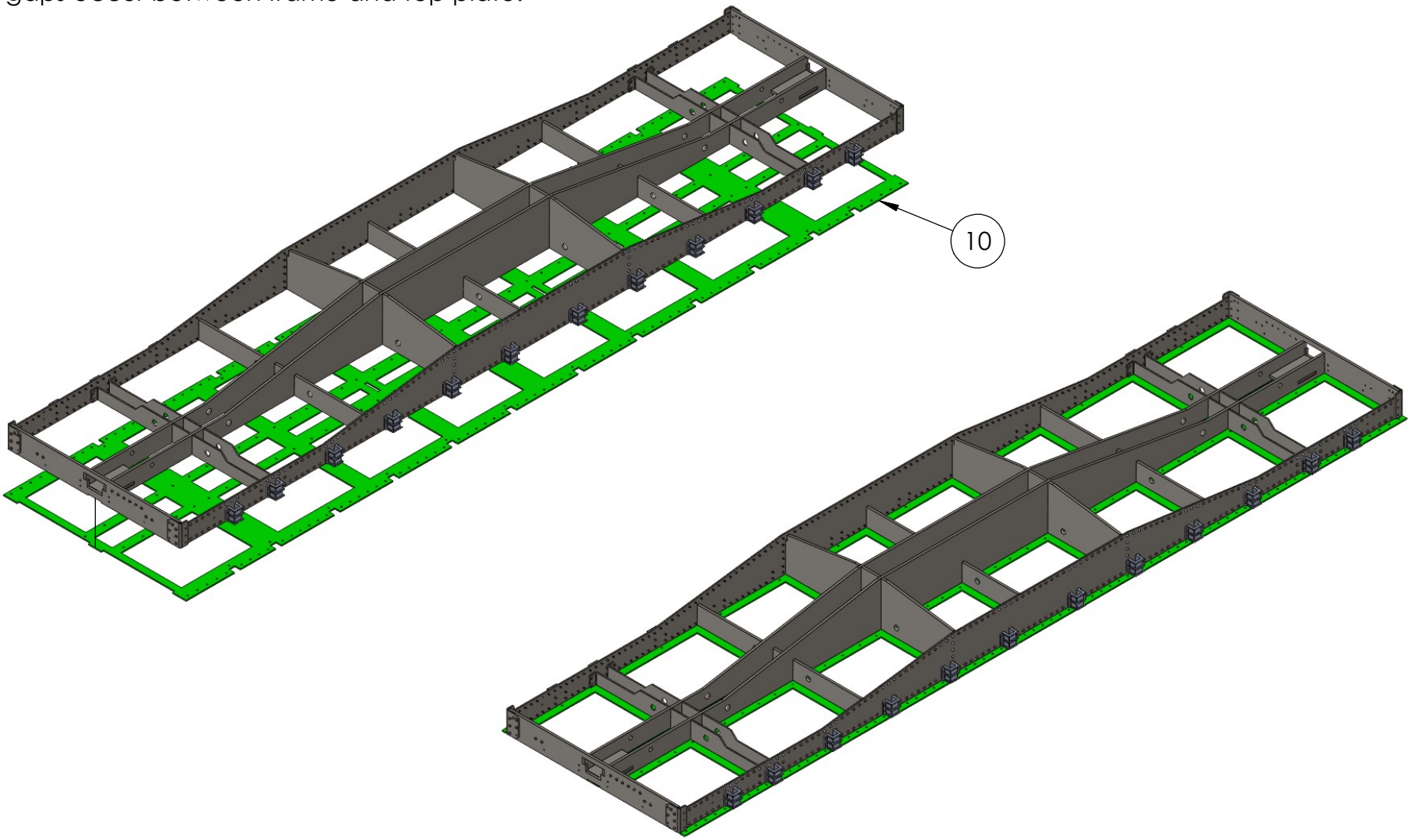
Locations of rivets to skip. Repeat on all corners.

DETAIL H

STEP 7: WELDING TOP PLATE

Tack weld top plate to frame and side assembly. Make sure locating tabs are fully inserted and no gaps occur between frame and top plate.

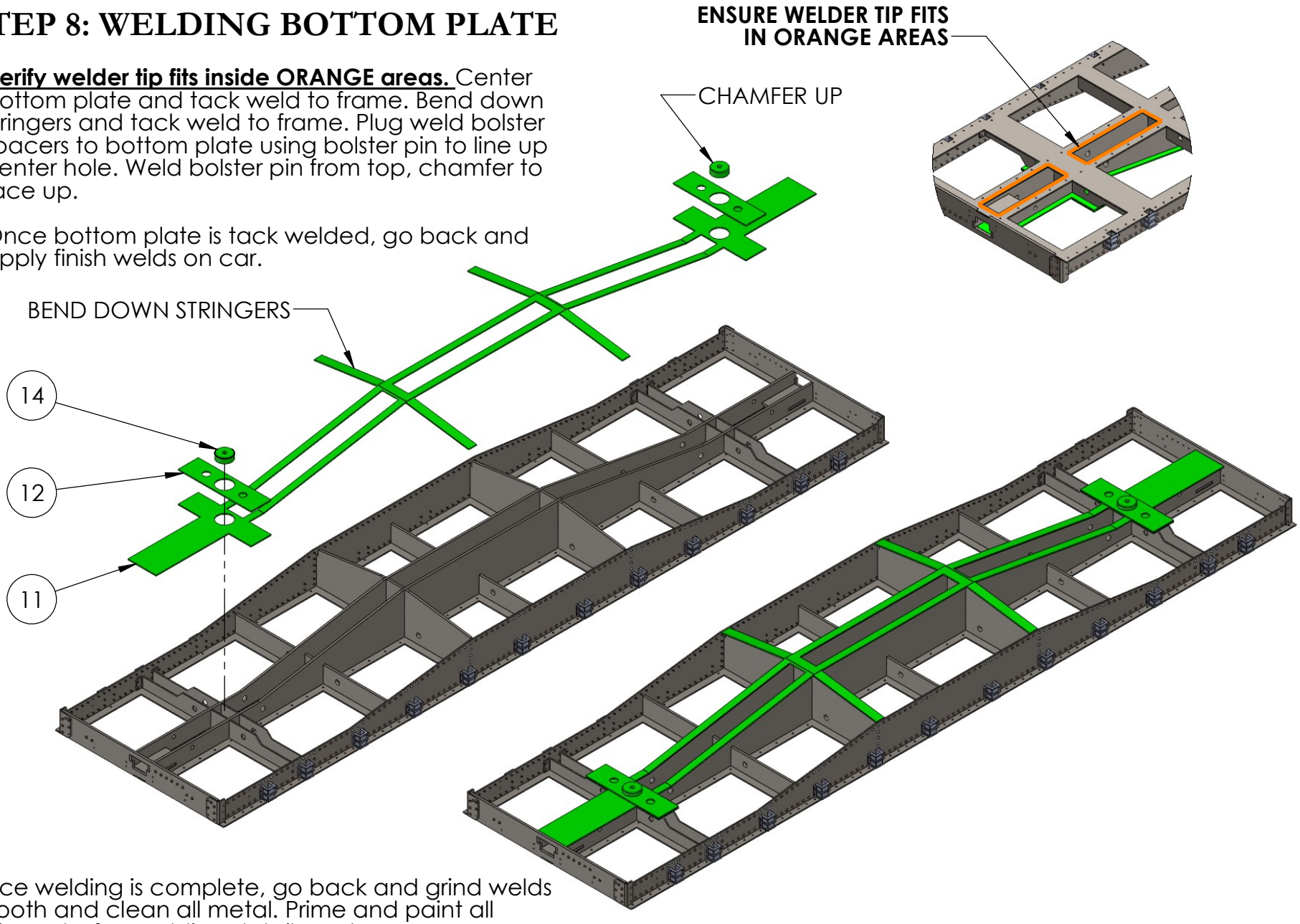
*****TACK WELD ONLY*****



STEP 8: WELDING BOTTOM PLATE

<u>Verify welder tip fits inside ORANGE areas.</u> Center bottom plate and tack weld to frame. Bend down stringers and tack weld to frame. Plug weld bolster spacers to bottom plate using bolster pin to line up center hole. Weld bolster pin from top, chamfer to face up.

Once bottom plate is tack welded, go back and apply finish welds on car.

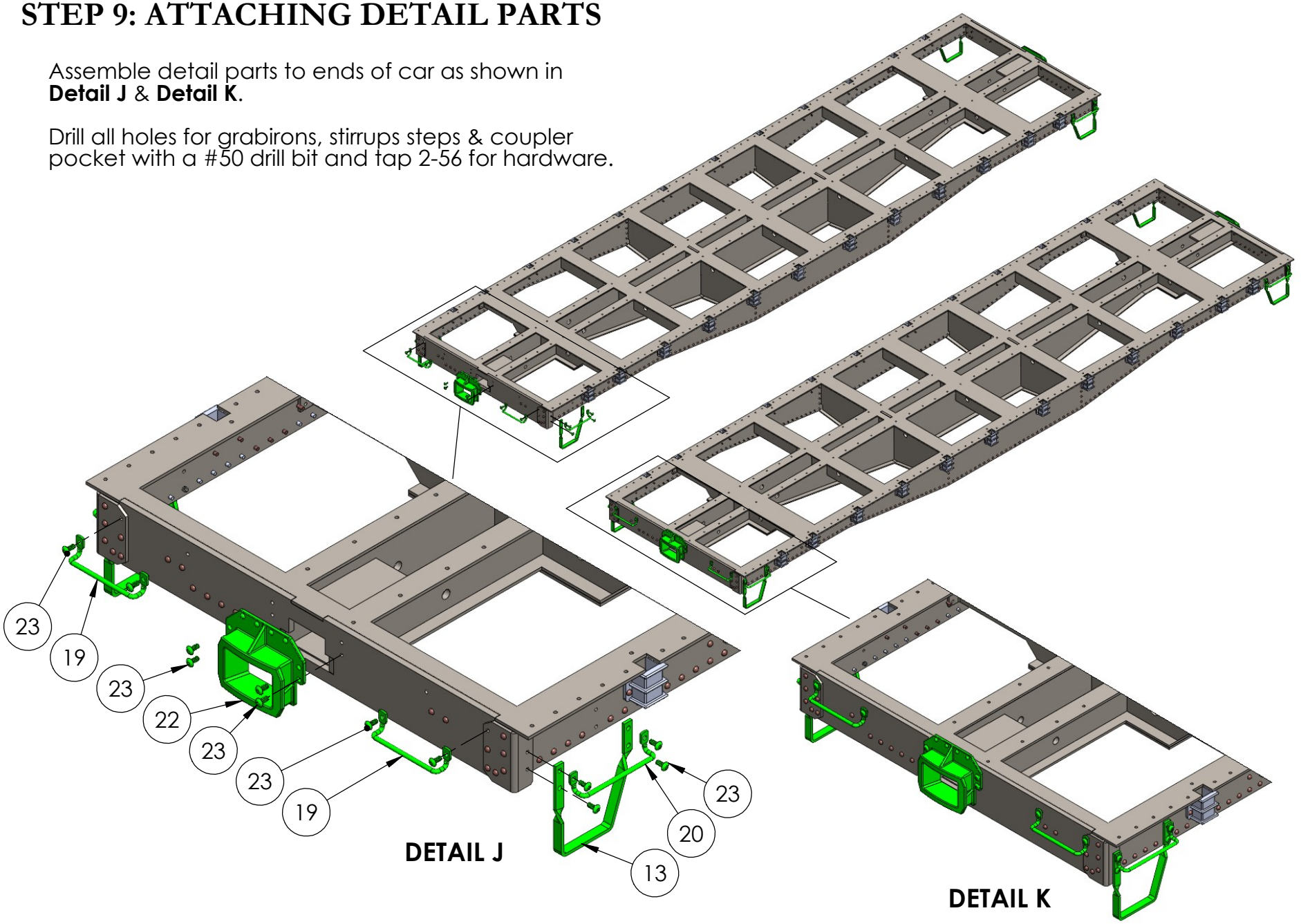


Once welding is complete, go back and grind welds smooth and clean all metal. Prime and paint all surfaces before adding details parts.

STEP 9: ATTACHING DETAIL PARTS

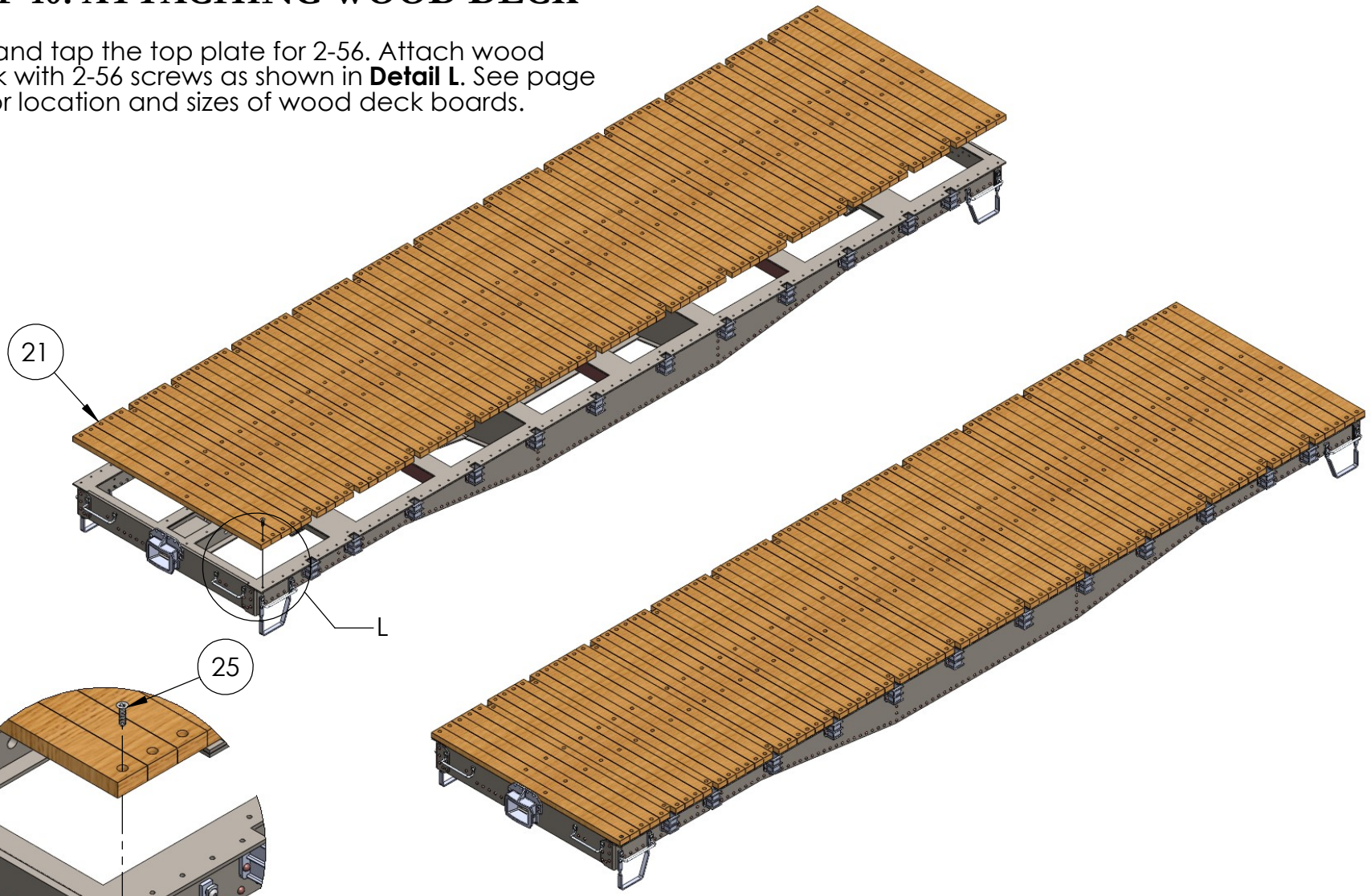
Assemble detail parts to ends of car as shown in **Detail J** & **Detail K**.

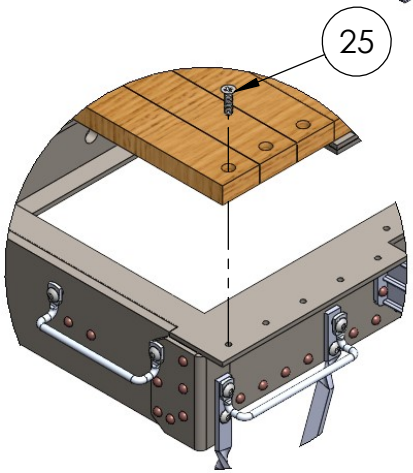
Drill all holes for grabirons, stirrups steps & coupler pocket with a #50 drill bit and tap 2-56 for hardware.



STEP 10: ATTACHING WOOD DECK

Drill and tap the top plate for 2-56. Attach wood deck with 2-56 screws as shown in **Detail L**. See page 15 for location and sizes of wood deck boards.



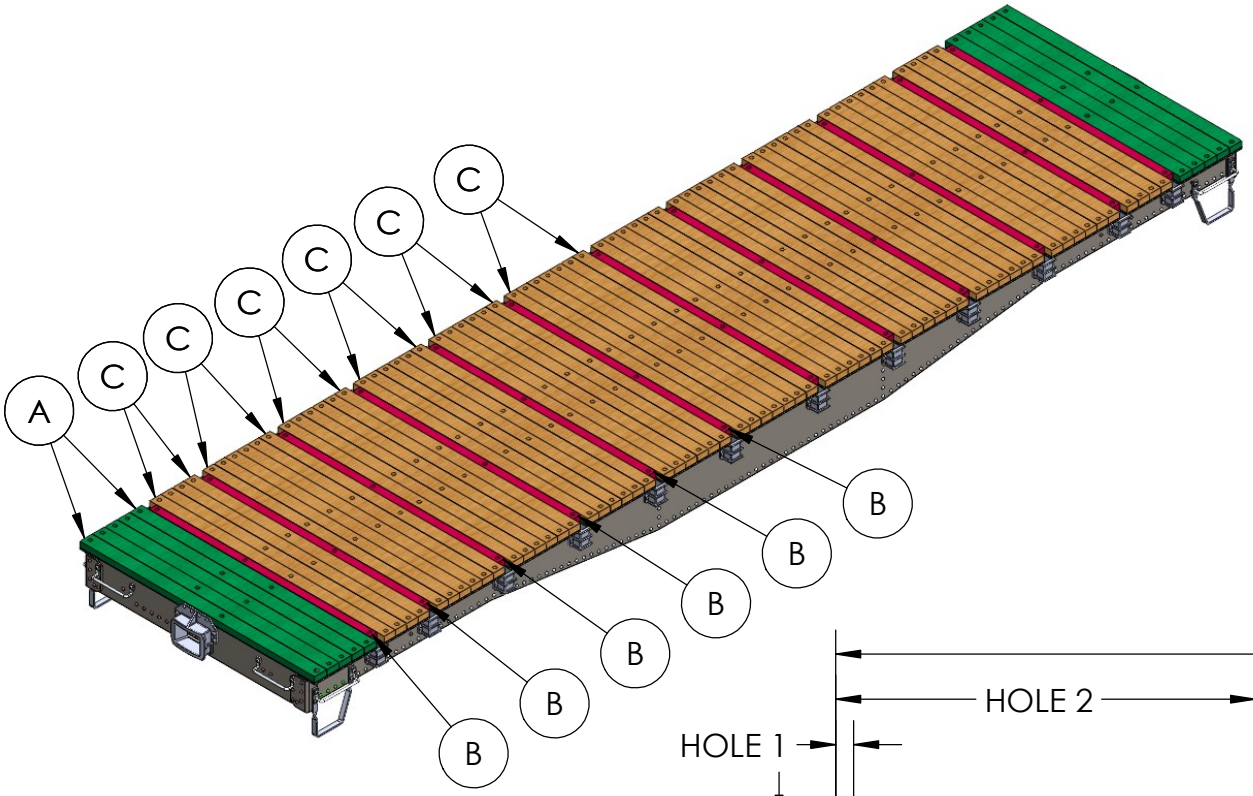


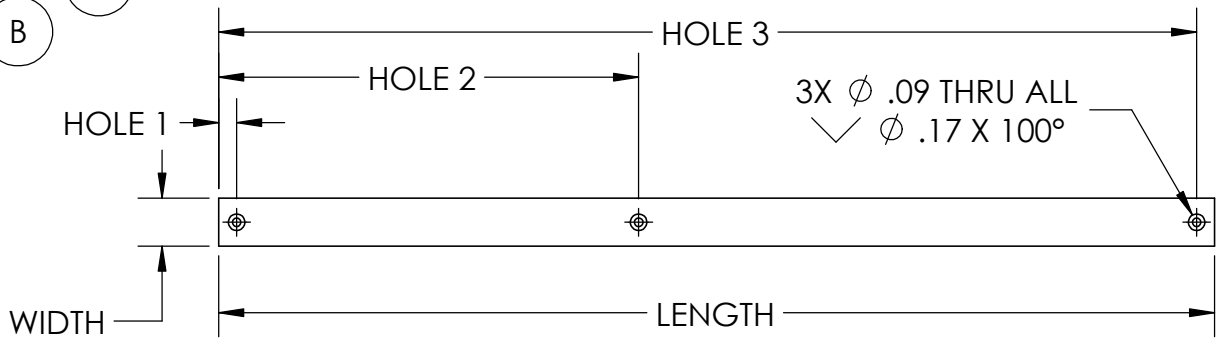
DETAIL L

WOOD DECK OVERVIEW

- All deck boards are 1/4" thick.
- If staining deck boards, plane width 0.010" under nominal to allow for swelling.
- Drill deck for appropriate fasteners. Recommadations are listed below for a #2 screw.
- Flip ever other board end to end to attach to deck (note hole locations in center of car). Repeat pattern on other end.

BOARDS				HOLE POSITIONS		
Type	QTY	Width	Length	Hole 1	Hole 2	Hole 3
A	10	0.55"	10.375"	0.188"	4.375"	10.188"
B	12	0.333"	9.75"	0.188"	4.063"	9.563"
C	63	0.5"	10.375"	0.188"	4.375"	10.188"





FREQUENTLY ASKED QUESTIONS

Q: My frame isn't fitting together and there are gaps, what is going on?
A: Care was taken in the design to incorporate tab and slot construction to avoid having to use jigs or special clamps to hold items in the correct positions for welding but that also increases the locations for interfercences to occur. Wiping down all the parts prior to welding is a good first step to remove grit from mating surfaces that may have accumlated from storage or the manufacturing process. Because of the laser cutting process used to cut out the parts, there may be some burrs on the corners. Use a file or grinder to remove them. Making sure to fit all the parts together before welding will help you locate where a problem is before items are welded together. During welding, weld BB's may get stuck to faces and should be grinded off as the steps are followed.

Q: I bought a completed kit that is E-coated. What is E-coating and how do I paint it?
A: E-coating is an immersion wet paint finishing process that uses electrical current to attract the paint product to a metal surface. While the process is similar to powder coating, it differs in that the part is held in a fluid bath that ensures all surfaces are coated helping to protect surfaces that may be difficult to access when painting. Before the part is E-coated, it is dipped in a chemical bath to remove oil and grit from the surface. After the part is E-coated, it is ready to accept almost all paints with minimal prep work required. E-coating does make the part come out black, but if you want your project to be black, you need to protect the coating with a top coat. E-coating is not UV stable and will break down in sunlight if not covered.