FIELD KIT

Vermeer MV Solutions, Inc.

Trenchless
Piedmont, South Carolina 29673 USA

FIELD CAMPAIGN KIT #: **VMV000088** **DATE:** **18 July 2024**

For Dealer Reference: **Service Bulletin #: SMV2024-015**

Frame Inspection, Frame Repair, Frame Replacement

CAMPAIGN TYPE:	**Mandatory – Product Safety** **DEALER INSTALLATION ONLY**
CAMPAIGN CATEGORY:	**Kit and Bulletin**

MACHINE/ ATTACHMENT MODEL(S):	**SERIAL NUMBERS:**		
	Included	**Excluded**	**Kit version**
LPSDT	**50453, 50458, 50465-50468, 50473 - 50476, 50478**	**50465, 50466, 50468**	**VMV01** **Inspection only**
LPSDT	**Included population will be determined on the basis of dealer inspection results.**	**None**	**VMV02** Missing Stiffener and no cracks are present. Frame is not deformed.
LPSDT	**Included population will be determined on the basis of dealer inspection results.**	**None**	**VMV03** Cracks are present and are not through I-beam transition. Frame is not deformed
LPSDT	**50465, 50466, 50468 Included population will be determined on the basis of dealer inspection results.**	**50465, 50466, 50468**	**VMV04** Cracks are present and are through I-beam transition and/or frame is deformed.

PRODUCT SAFETY ALERT

Purpose: TRAILER FRAME FAILURE MAY OCCUR. During manufacturing, frame stiffener may not have been placed correctly, resulting in reduced frame strength, increasing risk of a crack to develop. If a crack develops in the frame, it can result in severe damage to the vacuum excavator. If a crack develops and is not identified during the maintenance interval inspections, the frame can bend and/or distort resulting in loss of stability while towing. DEATH OR SERIOUS INJURY POSSIBLE. When towing the vacuum excavator on public roadways, death or serious injury may result due to the loss of control of the vacuum excavator and towing vehicle. A frame failure may increase the risk of a crash. Property or equipment damage may also occur.

VMV000088 has been created to provide the necessary parts and instructions to inspect frame for stiffener welding and presence or cracking, to add the stiffener plate if missing, and to repair cracks or replace frame if required. The kit must be installed as soon as possible.

Special tools and conditions:

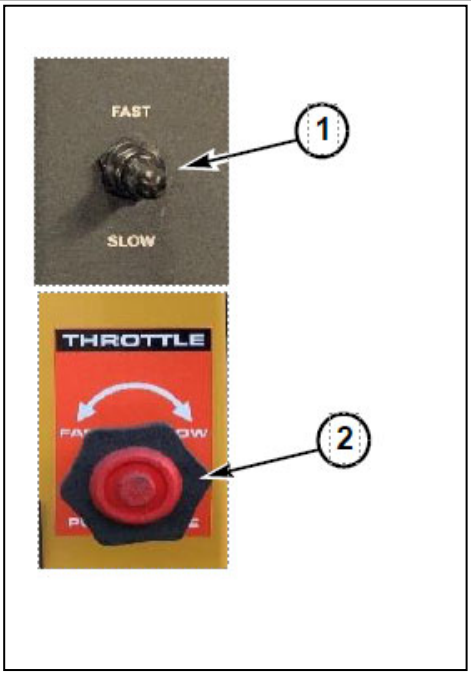
- Welding Machine

Shutdown Procedure:

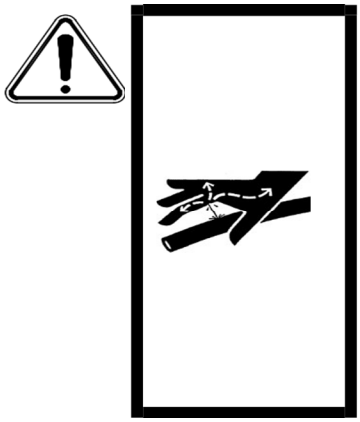
WARNING: Use the following shutdown procedure before attempting to do any of the work described in this kit.

1. Make sure end of vacuum hose is clear of all spoils, debris, and other materials.
2. Turn *Water Pump Switch* to off.
3. Push *Throttle Switch* **(1)** down or turn the *Throttle Knob* **(2)** right to slow the engine to idle.

   Note: Throttle style depends upon the machine model.
4. Idle engine five minutes to allow vacuum pump to cool down. This helps to prevent the buildup of condensation.
5. Turn *Keyswitch* to off to shut down engine and remove key.
6. Pull trigger on high pressure lines to relieve line pressure.



- Unless indicated, new parts from kit have callouts with numbers. Callouts with letters indicate existing parts or general items.



WARNING: Pressurized fluid can penetrate body tissue and result in death or serious injury. Leaks can be invisible. Keep away from any suspected leak. Relieve pressure in the hydraulic system before searching for leaks, disconnecting hoses, or performing any other work on the system. If you must pressurize the system to find a suspected leak, use an object such as a piece of wood or cardboard rather than your hands. When loosening a fitting where some residual pressure may exist, slowly loosen the fitting until oil begins to leak. Wait for leaking to stop before disconnecting the fitting. Fluid injected under the skin must be removed immediately by a surgeon familiar with this type of injury.

***Procedure 1*: Inspection Procedure – VMV010088**

1. Inspect machines for stiffener plates on both sides. Examples shown below.

Potential missing stiffener plate location on left side.

Potential missing stiffener plate location on right side.

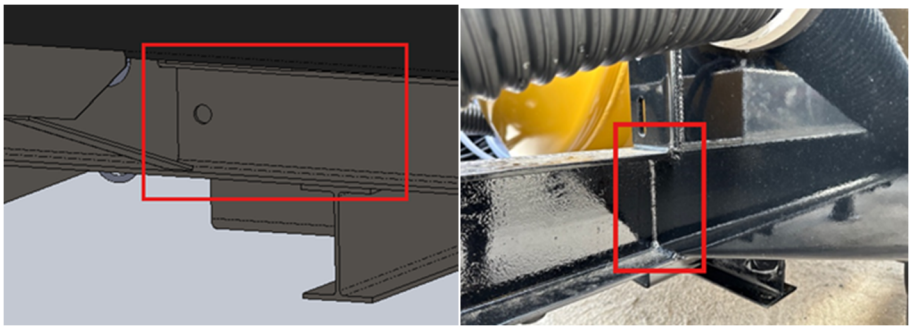
2. If both stiffener plates are present, continue using the machine.

3. Report findings to Vermeer. No further action needed.

4. If a stiffener plate is missing:

a. Inspect for cracks.

1) Inspect around the area where the plate would be under the fender. Inspect in front of the fender as well. Example of areas of concern are shown below.

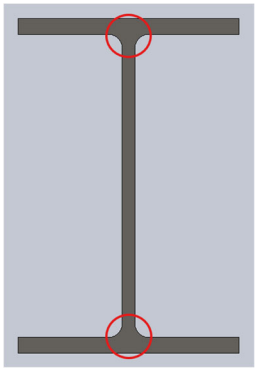


Potential Cracking Location Left Side

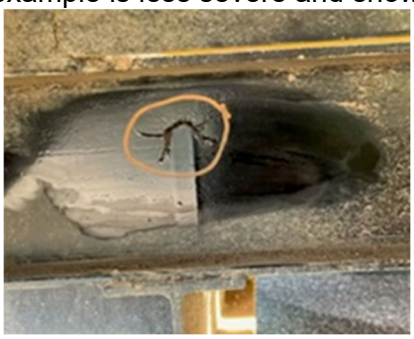
Potential Cracking Location Right Side

2) If no cracks are present, proceed to 4b.
3) If cracks are present, identify if the cracking is through the transition sections of the I-beam cross-section.

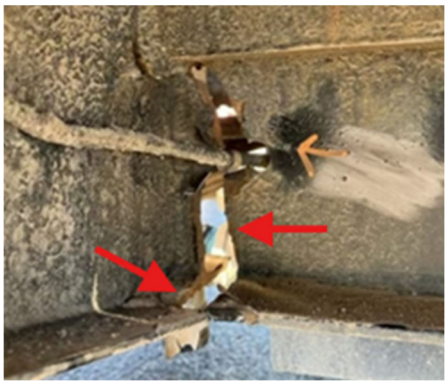
This cross-section image shows the transition portions of the I-beam circled in red, the areas where the center web meets each outer flange.



This example is less severe and shows cracking in only the web of the I-beam.



These examples are more severe and show cracking through the transition of the I-beam that includes the web and the flange. This is a failure in the I-beam and the frame is often deformed.



b. Inspect to see if the frame is deformed.

   1) Inspect for obvious bending/warping in the I-beam in the area where the plate is missing. Use a straight edge over the I-beam in this area to confirm.

5. Based on the findings from the previous step, follow the following steps:

a. Complete Dealer Inspection Results Report and submit with photos. Reference the below actions and kit numbers based on findings:

b. If both stiffener plates are present, continue using the machine. Report back findings to Vermeer. No further action needed.

c. VMV020088 – Procedure 2. No cracks are present. Frame is <u>not deformed</u>.

d. VMV030088 – Procedure 3. Cracks are present and are <u>not through</u> I-beam transition. Frame is <u>not deformed</u>.

e. VMV040088 – Procedure 4. Cracks are present and <u>are through</u> I-beam transition and/or frame <u>is deformed.</u>

***Procedure 02*: VMV020088 - Stiffener plates are missing. No cracks present. Frame is not deformed.**

1. Qualified/certified welder must prep area and weld in the plate per the Vermeer Corporation weld repair procedure on pages 8-18. Refer to the section ‘Welding of stiffener plates’ for detailed instructions on placement of stiffener plates and welds.

***Procedure 03*: VMV030088 - Stiffener plates are missing. Cracks are present and are <u>not through</u> I-beam transition. Frame is <u>not deformed</u>.**

1. Qualified/certified welder must repair cracks by drilling a hole in the end of each crack, gouging out the crack from the origin to the drilled hole, and then weld per the Vermeer Corporation weld repair procedure on pages 8-18. Refer to the sections ‘Prepping the crack(s) for repair’ and ‘Welding of crack(s)’ for detailed repair guidance.
2. Qualified/certified welder must prep area and weld in the plate per the Vermeer Corporation weld repair procedure on pages 8-18. Refer to the section ‘Welding of stiffener plates’ for detailed instructions on placement of stiffener plates and welds.

***Procedure 04*: VMV040088 - Stiffener plates are missing. Cracks are present and <u>are through</u> I-beam transition and/or <u>frame is deformed</u>.**

1. Complete Dealer Inspection Results Report and submit with photos.
2. Trailer frame needs to be replaced. Call service/factory for guidance.

Vermeer Corporation Welding Instructions:

Scope:

These field welding instructions are intended for use of weld repairs and addition of stiffener plates on the LP 873 SDT Heavy trailer frame, drawing W2-LP08-T-S5.

Limitations:

These welding instructions are intended for use only with Vermeer Corporation supplied or approved components and as directed by Vermeer Corporation.

Certifications:

All welding shall be performed by a welder qualified in the position and process used to AWS D14.3/D14.3M, Specification for Welding Earthmoving, Construction, and Agriculture Equipment or one of the following: AWS D1.1, ASME Section IX, ISO 9606-1.

Work Area Preparation & Safety:

The company performing the welding is responsible for supplying the appropriate protective equipment, complying with the appropriate safety regulations (e.g. ANSI Z49.1), and taking appropriate measures to protect their personnel in the welding environment. Further, they are responsible for protecting sensitive equipment and components from the hazards of welding (e.g. shielding electronics, paint, plastics, etc. from the heat, light, and sparks of arc welding). Follow the battery and/or controller disconnection specifications in the machine service manual. Disassemble the machine as necessary to provide adequate access to repair areas. The area where work will be performed is emphasized in figure 1. This figure shows the left side, but the emphasized area is also reflected on the right side.

Directions:

Set weldment on jacks or blocks:

1) Only necessary if weld access requires it.

Prepping the crack(s) for repair:

1) Determine overall crack length by visual inspection and/or preferably by magnetic particle or dye penetrate. Appropriately clean area before performing test. Mark the extent of the cracks to guide cutting/gouging them out.
2) Once end of crack location is determined, drill a 1/8” diameter hole thru the beam where the crack tip ends (reference figure 2 for I-beam flanges and figure 9 for I-beam web). If end location of crack is difficult to determine, then drill the hole ¼” away from where the crack is believed to end to be safe.

3) se a cut-off wheel or other appropriate tool to grind out the crack along its length. Cut out any cracked welds in the area too. Go from the origin of the crack to the OD of the hole that was drilled. Then widen root opening to 1/8” along the entire length of the crack area. The resultant should be a 1/8” wide cut in the beam that starts at the edge and goes to the drilled hole (reference figure 3) for flanges. For the web, the crack should be gouged out until no cracks are visible, which may or may not be through the entire web (reference figure 10).
4) Reinspect to ensure the entirety of the crack(s) has been removed. Use the same inspection process selected in step 1. If any remaining crack is found, repeat steps 1-4.
5) At this time, clean all weld surfaces with a grinder. Surfaces within ½ inch [12 mm] of weld locations shall be free from any material that will prevent proper welding. This includes moisture, loose or thick mill scale, paint, slag, heavy rust, grease, dirt, or any other foreign material that will adversely affect the quality or strength of the weld.

Welding of crack(s):

1) Follow the weld parameters and guidelines that are later in the document during this procedure
2) Verify straightness of beam is still proper before welding.
3) For web cracks, weld the area that was gouged (reference 11). Weld does not need to be ground flat as nothing is welded to this face. If cracks were through the beam, back gouge through the opposite side and weld the area on this face as well.
4) For flange cracks, start by using a run-on tab(s) (small piece of scrap metal) and tack to the inside edge of the beam frame so you can start the weld here and not the frame (reference figure 4). This will increase the chance of a good quality edge tie-in. Use two pieces if necessary and set the same 1/8” root opening, the size of the run-on tabs is not important, only to match the ¼” frame thickness.
5) Once run-on tab is tacked, weld the top side (inside) of the I-beam frame. Begin on the run-on tab and end where the hole is located (reference figure 5).
6) Next, back gouge from the bottom side to sound metal using appropriate means (grind or carbon arc.) A full penetration weld is required here so be sure to verify gouge is deep enough.
7) Once back gouge is complete, finish the overhead weld (reference figure 6).
8) When welding is complete here, cut off run-on tab and grind edges smooth. Also grind the top and bottom sides of the repaired weld face flat if the reinforcement is beyond 1/8” high or the toe angles are not optimal. (If weld looks good, you will still have to grind the top side (inside) weld because a plate sits there) (Reference figure 7 & 8).
9) Retest finished weld by dye penetrant or magnetic particle to verify no cracks occurred during the repair process and weld repair is acceptable.

Welding of stiffener plate(s):

1) Next, weld in the supplied or cut stiffener plates to reinforce the area.
2) Place stiffener plate in between the I-beam frame flanges, pushing in towards the web for a snug fit, and butt against existing fender front gusset (reference figure 12). The face of any weld repair will need to be ground flat here if not already done. Any areas the stiffener plate touches will also need to have the paint ground off if not already done. Tack the plate in place.
3) Begin by welding the top and bottom sides of the plate to the beam flanges with a .2" fillet. Be sure these fillet welds tie-in properly to any existing weld. Grind a transition tie-in gouge into the existing butt weld if necessary to make a clean tie-in to the new fillet welds. Also, at the termination of the horizontal welds - extend weld bead termination as a run-out – 1" straight and 1" diagonal as shown in figure 13.
4) Then weld the vertical joint with a .2" fillet (reference figure 13).
5) Repeat welding of the plate and subsequent steps for opposite side of trailer frame as well

Final work:

1) Inspect all welds in accordance with the weld quality acceptance criteria listed on page 12. Repair any defective welds and reinspect. If defects (no go) are found, remove and repair them using one of the weld processes listed in this document.
2) Remove any temporary tacks that are outside weld joints.
3) Grind any hard notches or unacceptable weld profiles down. Pay particular attention to having a smooth leading etch on the run-out weld beads from the stiffener plates.
4) Reinspect general area to be sure no cracks formed during the repair process.
5) Paint area as required once weld has cooled.

Welding Parameters:

Base Metal Preparation:

1) Before tacking or welding, the base metal within 3 inches [76mm] of the weld joint in all directions must be at or above the preheat temperatures listed below. During welding, the base metal temperature must be maintained above the preheat temperature and below the maximum interpass temperatures listed below:
2) Minimum preheat: 50°F [10°C]
3) Maximum interpass temperature: 500°F [260°C]

Work Lead Connection (Grounding):

1) Welding or cutting work leads (commonly referred to as a grounds or ground clamps) should be attached directly to the weldment being repaired/modified and as close to the point of welding or cutting as practicable. Additionally, it must be firmly connected to bare metal (paint removal is usually necessary). In no case shall the ground path be allowed to pass through bearings, electronics, bolted connections, or other sensitive components or connections.

Gas Metal Arc Welding [GMAW/MIG/MAG]:

1) Environment: This process shall only be used when welding can be performed in a shop environment and the weld joints can be positioned in the flat or horizontal positions. If vertical or overhead welding is required, FCAW or SMAW are recommended.
2) Electrode: AWS classification ER70S-3 or ER70S-6 [ER48-S6] (e.g. Lincoln L50 or L56)
3) Size: 0.045" [1.2 mm]
4) Wire Feed Speed: Minimum 350 IPM [9 MPM] - Maximum 520 IPM [13 MPM] (optimum 450 IPM [11.5 MPM])
5) Voltage: Minimum 26 volts - Maximum 30 volts (optimum 27.5 volts)
6) Amperage: Amperage is a function of wire feed speed, but should read in the range of 250-370
7) Electrode Stickout: ½ " – ¾ " [12 mm – 20 mm]
8) Shielding Gas: 95% Argon - 5% Oxygen or 90% Argon - 10% CO_2 at 40 cfh [1.1 cmh]
9) Position: All welding should be in the flat or horizontal position. Vertical welding shall be uphill. **No downhill welding is permissible.**

Flux Core Arc Welding [FCAW]:

1) Environment: This process should only be used when welding can be performed in shop environment for all welding positions. Protect the area from wind and moisture. If field welding is required, SMAW is recommended.
2) Electrode: AWS classification E71T-1M [E491T-1M] (e.g. Lincoln Ultracore 71A85)
3) Size: 0.052" [1.3 mm] or 1/16” [1.6mm]
4) Wire Feed Speed: Minimum 200 IPM [5 MPM] - Maximum 500 IPM [13 MPM]
5) Voltage: Minimum 23 volts - Maximum 30 volts
6) Amperage: Amperage is a function of wire feed speed, but should read in the range of 220-370
7) Electrode Stickout: ¾ " – 1 " [20 mm – 25 mm]
8) Shielding Gas: See electrode manufacturer recommendation (usually 75Ar/25CO_2 or 100 CO_2@ 40 cfh [1.1 cmh])
9) Position: Flat, horizontal, vertical and overhead positions are permissible. Vertical welding shall be uphill. **No downhill welding is permissible.**

Shielded Metal Arc Welding [SMAW/MMA]:

Environment: This process may be used in either a shop environment or field environment for welding positions. Protect the area from wind and moisture.

Electrode: AWS classification E7018 [E4918] or equivalent

Size: 1/8" [3.2 mm] or 5/32” [4.0 mm]

Polarity: Direct Current Electrode Positive

Amperage: 110-135 amps for 1/8” [3.2mm] and 125-200 amps for 5/32” [4.0mm]

Position: Flat, horizontal, vertical and overhead positions are permissible. Vertical welding shall be uphill. **No downhill welding is permissible.**

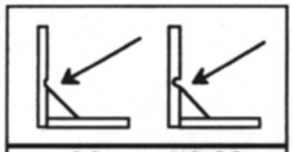
Electrode Condition:

- All electrodes shall conform to AWS specification A5.1 and should be purchased in hermetically sealed containers or should be baked by the user in an oven one hour between 500°F [260°C] and 800°F [430°C] prior to use.
- Immediately after opening the hermetically sealed container, electrodes should be stored in ovens held at a temperature of at least 250°F [120°C].
- After hermetically sealed containers are opened or after electrodes are removed from baking or storage ovens, the electrode exposure to the atmosphere should not exceed four hours. If electrodes have been exposed to the atmosphere for more than four hours, they shall be rebaked in an oven for one hour between 500°F and 800°F [260°C and 430°C].
- Electrodes should be rebaked no more than one time.
- Electrodes that have been wet shall not be used.

Weld Quality Acceptance Criteria:

- All welding shall be in accordance with the figure below. Any welds that do not conform (no go) must be repaired to bring them back into compliance (go). It is the responsibility of the company performing the repair to inspect the welds and ensure that they meet these quality requirements.

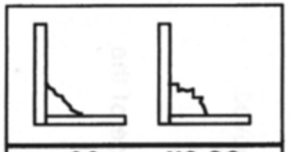
Figure 4.4 Weld Quality Acceptance Criteria



GO NO GO

UNDERCUT

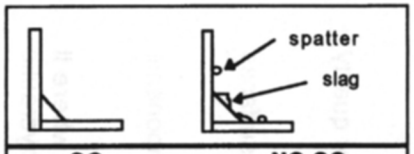
Undercut in excess of 1/32" is unacceptable. The "No Go" **example* is just beyond 1/32".



GO NO GO

ROUGHNESS

If the profile is very uneven or if the size varies a lot, the weld is too rough.



GO NO GO

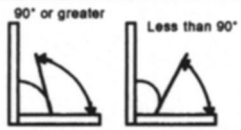
CLEANING

The cleaning **example* on the right is shown as "(Go/No Go)" because internal standards set different limits of what is acceptable depending on the function of the part. In most cases spatter is unacceptable.

GO NO GO

TIE-IN

A tie-in should blend all intersecting welds together smoothly. The welds must be within size limits, and tie-ins must meet all other external weld characteristic requirements.



GO NO GO

OVERLAP

When the angle at the toe of the weld, between the weld metal and the base metal, is less than 90°, the weld is unacceptable.

NO GO

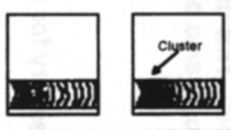
LACK OF FUSION

Any lack of fusion is unacceptable. Therefore there isn't a "Go" **example*.

GO NO GO

CRATER FILL

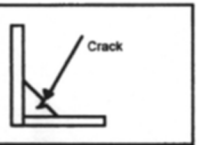
Craters usuall occur where a weld stops and must be filled. This "Go" **example* has been correctly filled to 85% or more of the specified throat. This "No Go" **example* hasn't been filled enough.



GO NO GO

POROSITY

- Pin holes larger than 1/16" diameter are unacceptable.
- More than1 pore in any 3" of weld or 2 pore in any 12" of weld is unacceptable
- Cluster porosity is unacceptable.



NO GO

CRACK

Any crack is unacceptable. Therefore there isn't a "Go" **example*.

GO NO GO NO GO

FILLET SIZE

- Both legs must be equal to the specified print size, minus 1/32", plus 1/8" maximum.
- No concavity is allowed. (Minimum throat size of 0.7 times the specified leg size produces a flat weld profile.)
- See ropiness table (at right) for convexity tolerance.

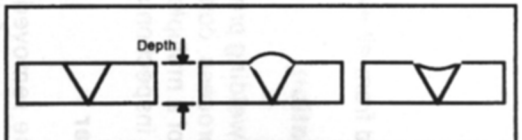
GO NO GO

ROPINESS

(CONVEX FILLET WELDS)

(Use a weld gage to check ropiness)

The fillet weld throat that measures greater than the next larger size fillet weld gage is unacceptable.



GO NO GO NO GO

GROOVE SIZE

If weld depth is:	then max. convexity is:	and max. concavity is:
2" or less	1/8"	none
over 2"	3/16"	none

- The drawings are exaggerated to show the defect.

*The word *"example"* always means the plastic examples not drawings.

These examples relate only to external appearance!
They do not necessarily indicate the structural strength of the weld.

Weld Procedure Figures 1 through 13:

Figure 1: Complete trailer frame, left side fender made transparent, work area emphasized.

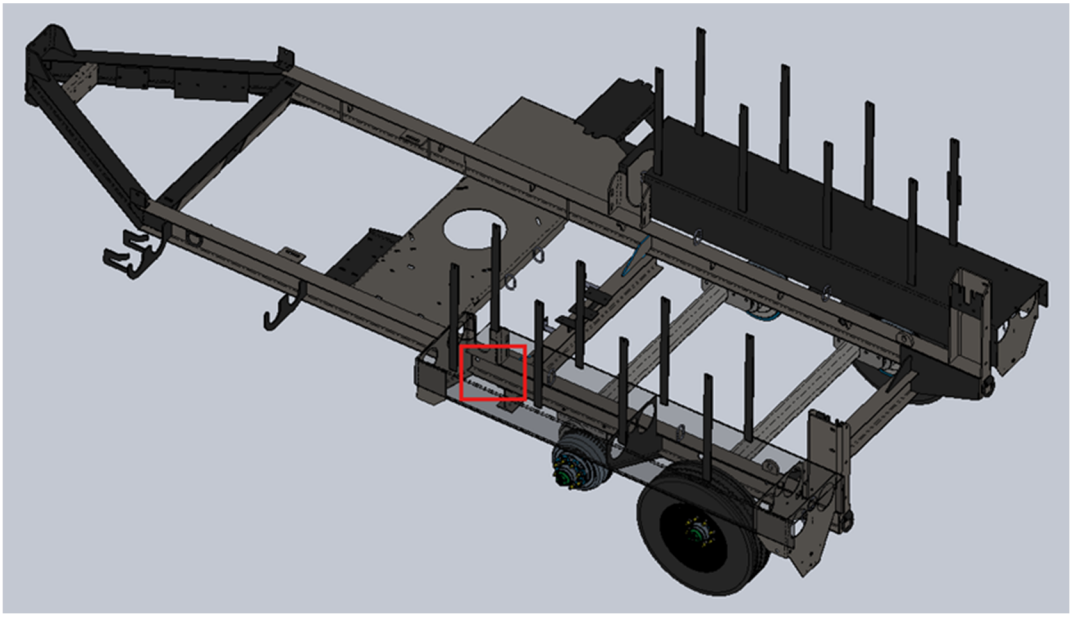


Figure 2:

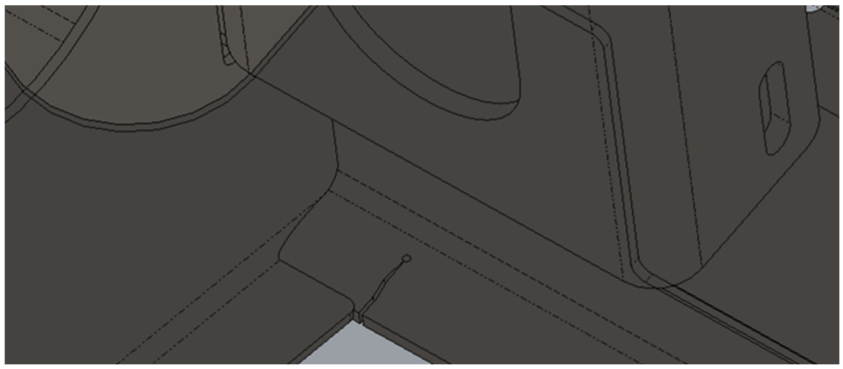


Figure 3:

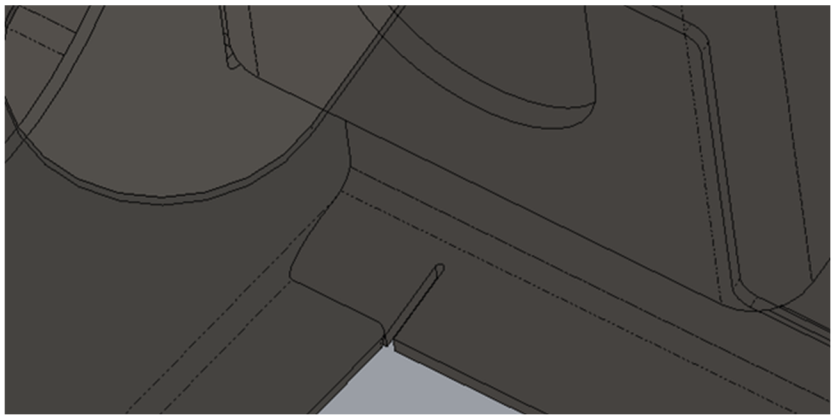


Figure 4:

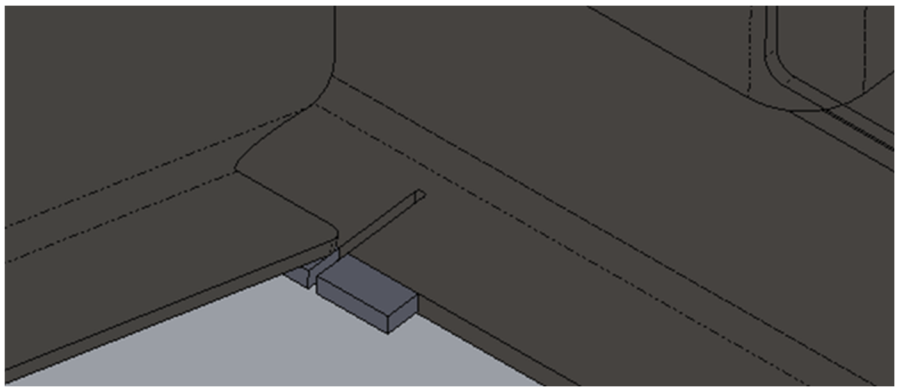


Figure 5:

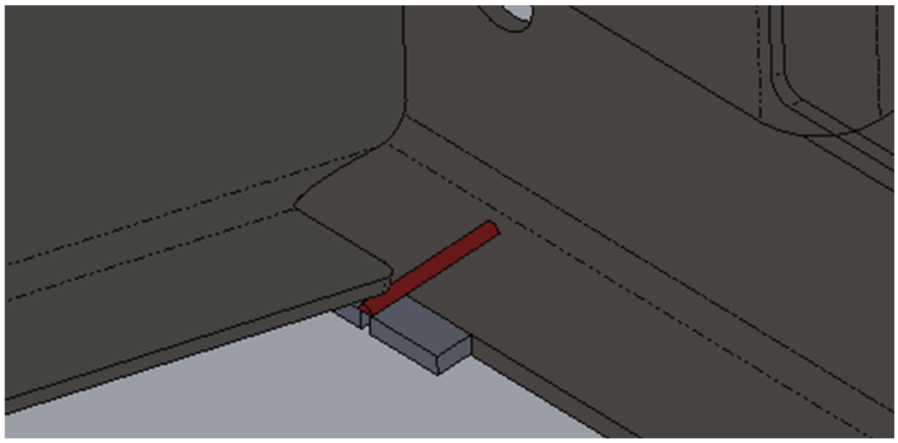


Figure 6:

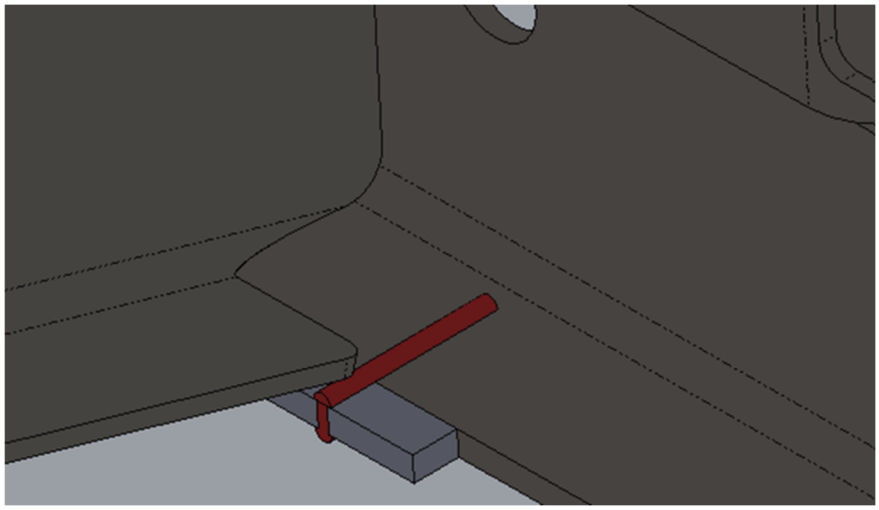


Figure 7:

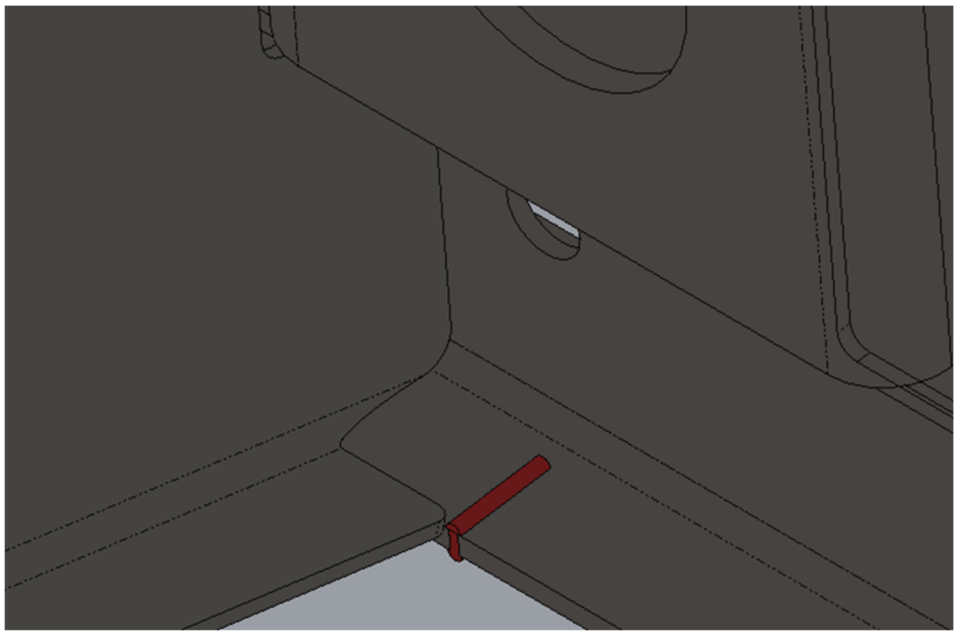


Figure 8:

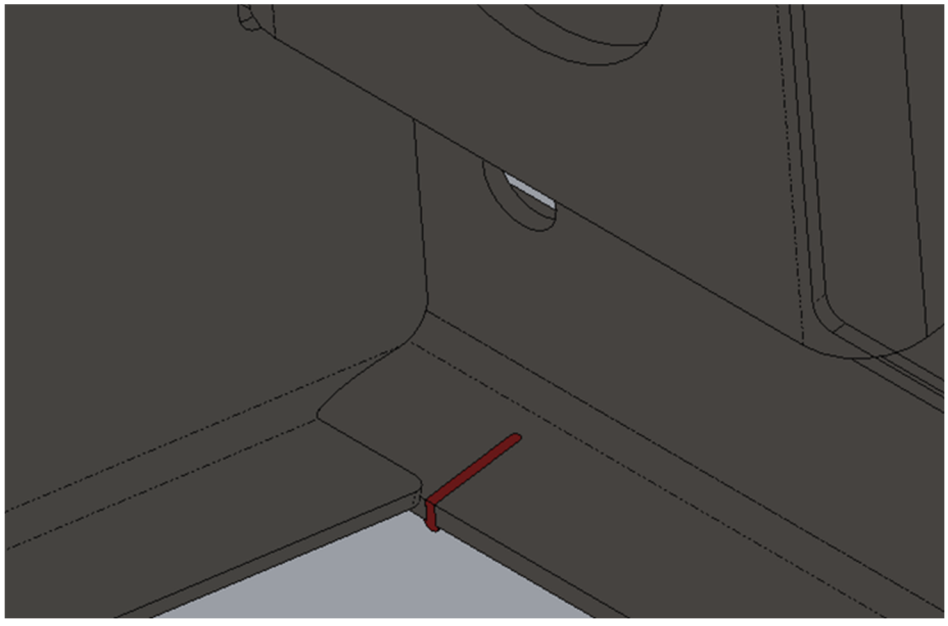


Figure 9:

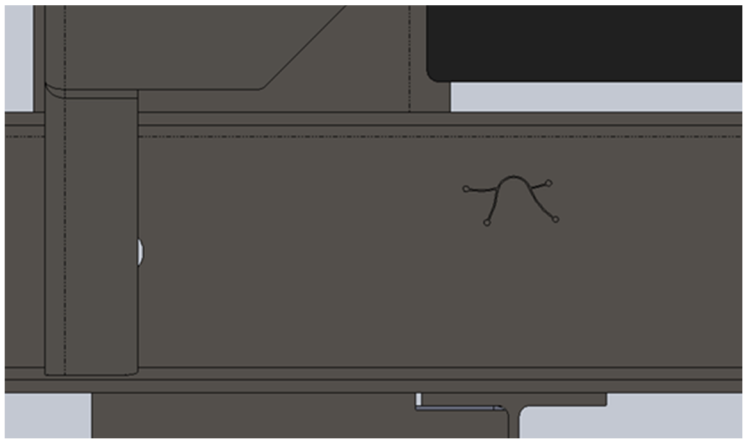


Figure 10:

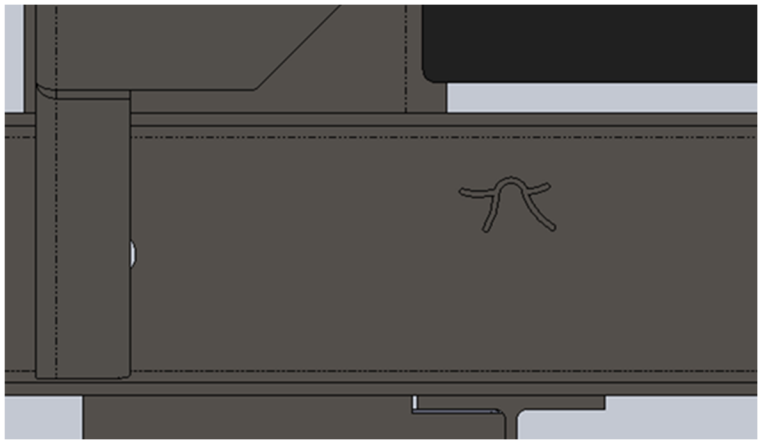


Figure 11:

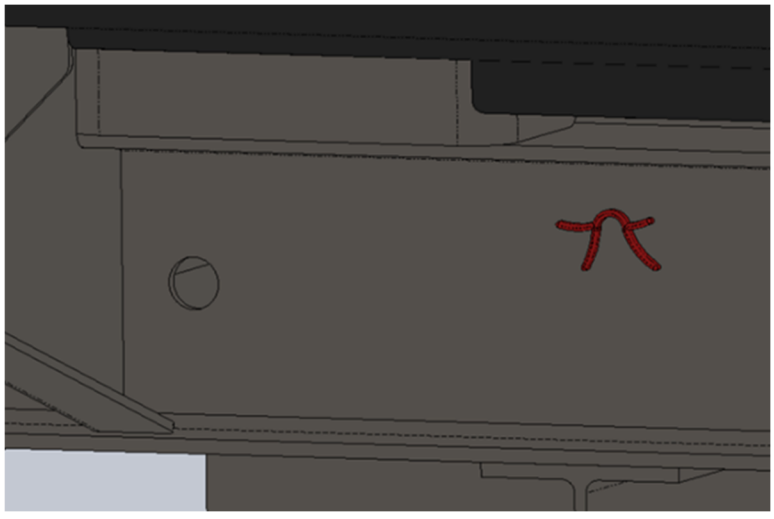


Figure 12:

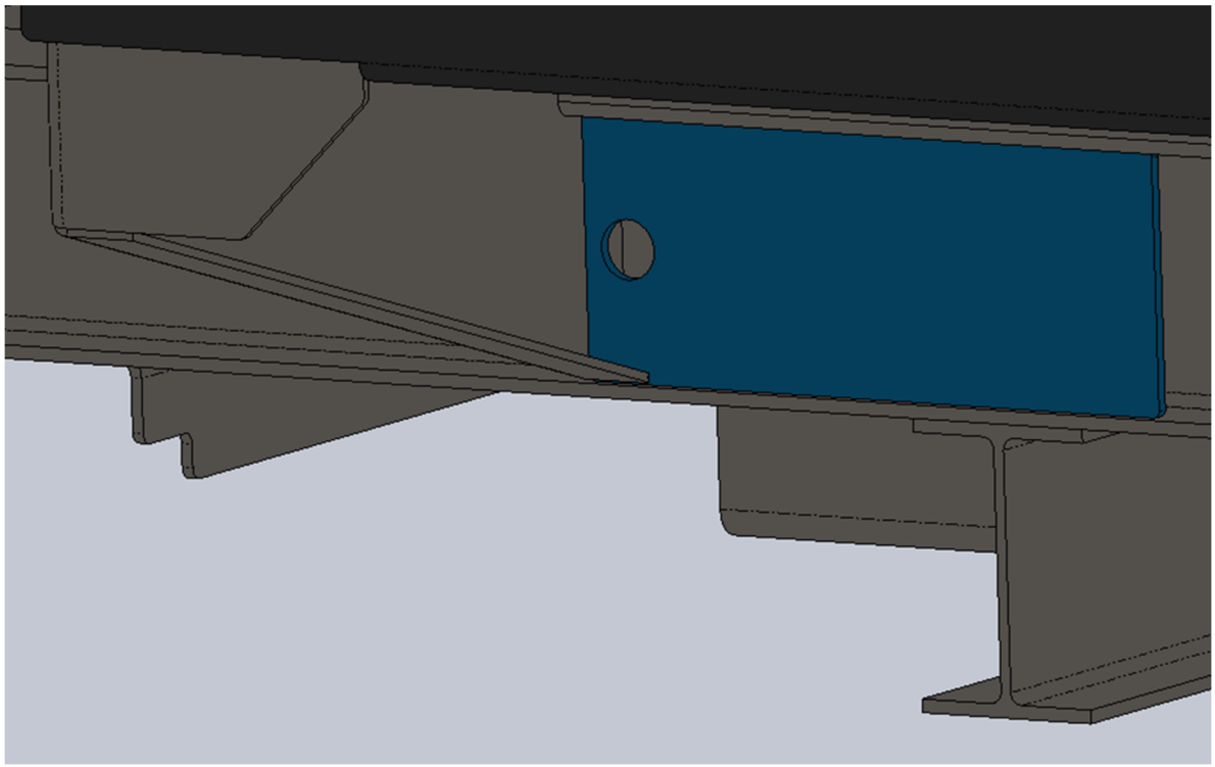
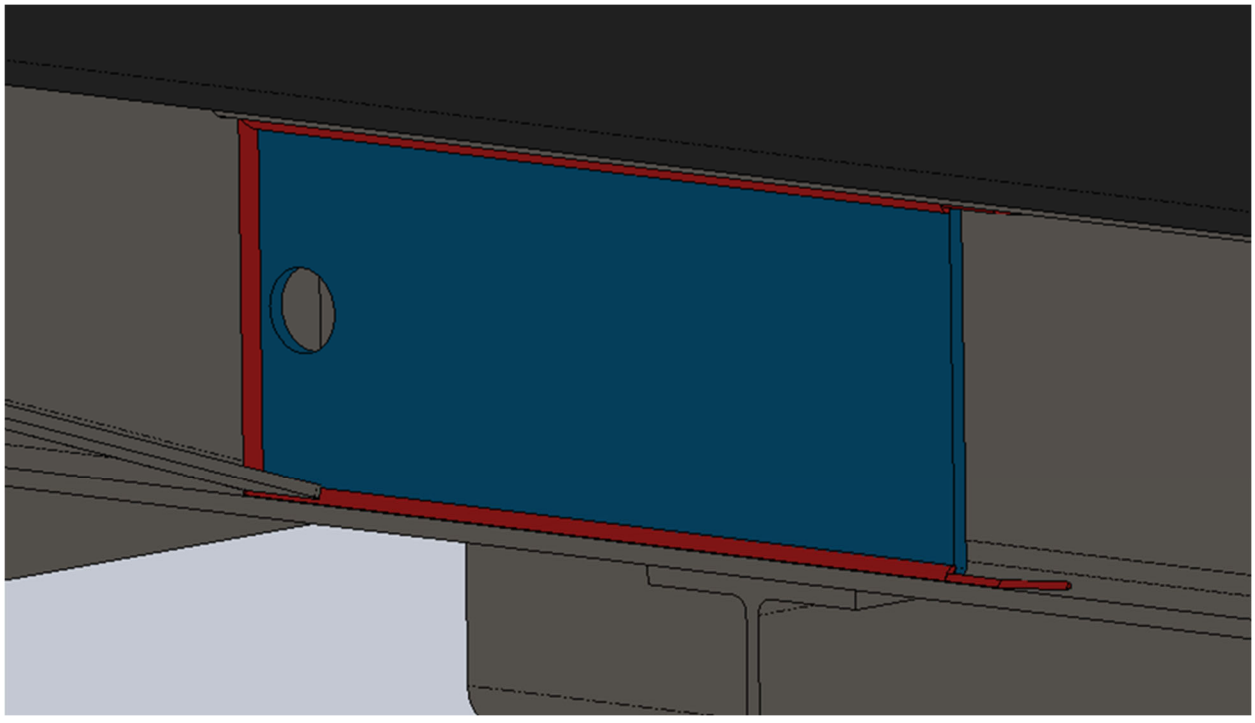
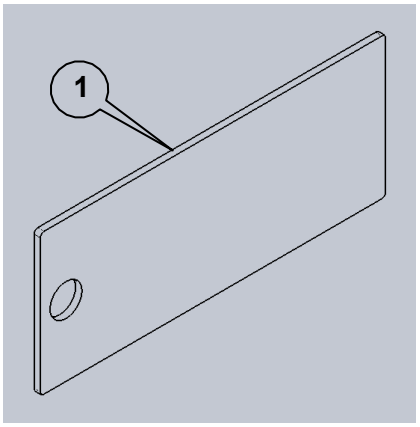


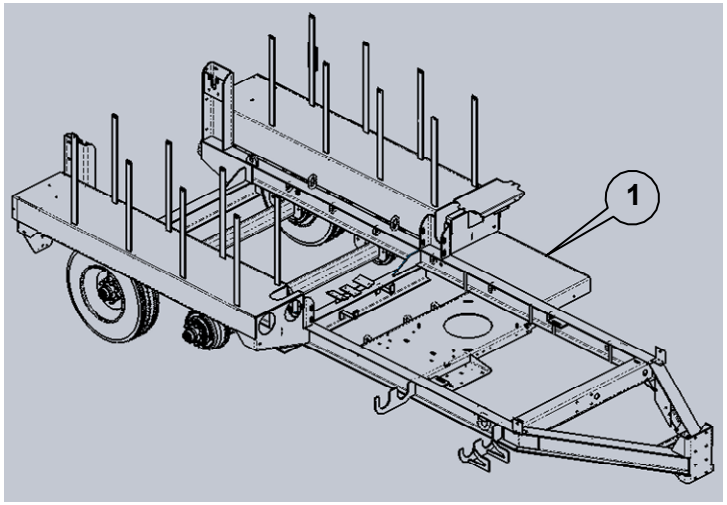
Figure 13:



UNIT OWNER COPY:
Insert in parts manual
for future reference.



Kit 1	Kit 2



Kit 3

Kit 1 parts list – VMV020088				
REF. NO.	**PART NO.**	**DESCRIPTION**	**VMV020088 QTY.**	**Remarks**
1	F250-4955	Stiffener, 800 Frame	2	
		Kit includes all items in Kit 1 parts list.		

Kit 2 parts list – VMV030088				
REF. NO.	**PART NO.**	**DESCRIPTION**	**VMV020088 QTY.**	**Remarks**
1	F250-4955	Stiffener, 800 Frame	2	
		Kit includes all items in Kit 2 parts list.		

Kit 3 parts list – VMV040088				
REF. NO.	**PART NO.**	**DESCRIPTION**	**VMV020088 QTY.**	**Remarks**
1	W2-LP08-T-S5	Weldment, LP800 Hvy Int. SHT w/200 Gal. Water Tank	1	
		Kit includes all items in Kit 3 parts list.		