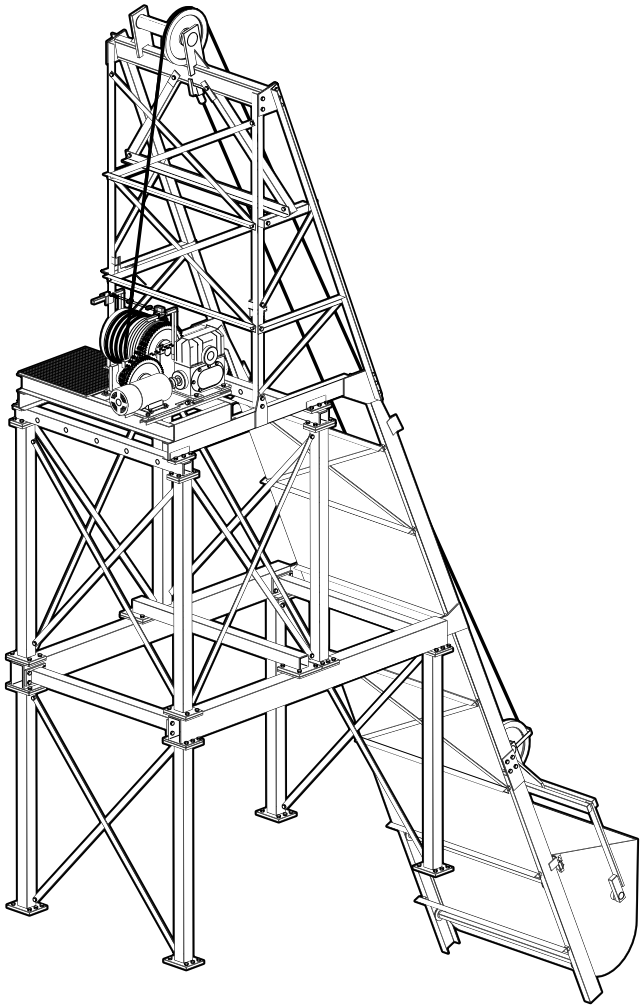
BESSER

SKIP LOADER

MODEL 120 CUBIC FOOT



INSTALLATION MANUAL

466370F9701

JUNE 1997 • US$250

BESSER World Headquarters
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Phone (517) 354-4111

BESSER

COMPANY NAME: .....

SERIAL NUMBER: .....

ASSEMBLY NUMBER: .....

WIRING DIAGRAM NUMBER: .....

INSTALLATION DRAWING NUMBER: .....

SKIPLOADER 120
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SAFETY BULLETIN

This notice is issued to advise you that some previously accepted shop practices may not be keeping up with changing Federal and State Safety and Health Standards. Your current shop practices may not emphasize the need for proper precautions to insure safe operation and use of machines, tools, automatic loaders and allied equipment and/or warn against the use of certain solvents or other cleaning substances that are now considered unsafe or prohibited by law. Since many of your shop practices may not reflect current safety practices and procedures, particularly with regard to the safe operation of equipment, it is important that you review your practices to ensure compliance with Federal and State Safety and Health Standards.

IMPORTANT

The operation of any machine or power-operated device can be extremely hazardous unless proper safety precautions are strictly observed. Observe the following safety precautions:

- Always be sure proper guarding is in place for all pinch, catch, shear, crush and nip points.
- Always make sure that all personnel are clear of the equipment before starting it.
- Always be sure the equipment is properly grounded.
- Always turn the main electrical panel off and lock it out in accordance with published lockout/tag-out procedures prior to making adjustments, repairs, and maintenance.
- Always wear appropriate protective equipment like safety glasses, safety shoes, hearing protection and hard hats.
- Always keep chemical and flammable material away from electrical or operating equipment.
- Always maintain a safe work area that is free from slipping and tripping hazards.
- Always be sure appropriate safety devices are used when providing maintenance and repairs to all equipment.
- Never exceed the rated capacity of a machine or tool.
- Never modify machinery in any way without prior written approval of the Besser Engineering Department.
- Never operate equipment unless proper maintenance has been regularly performed.
- Never operate any equipment if unusual or excessive noise or vibration occurs.
- Never operate any equipment while any part of the body is in the proximity of potentially hazardous areas.
- Never use any toxic flammable substance as a solvent cleaner.
- Never allow the operation or repair of equipment by untrained personnel.
- Never climb or stand on equipment when it is operational.

It is important that you review Federal and State Safety and Health Standards on a continual basis. All shop supervisors, maintenance personnel, machine operators, tool operators, and any other person involved in the setup, operation, maintenance, repair or adjustment of Besser-built equipment should read and understand this bulletin and Federal and State Safety and Health Standards on which this bulletin is based.

SAFETY SIGNS

Sign	Description	Required
1	Electric Motor	1
2	All Machines	1
	All Panels	1
3	Mixer	4
4	Block Machine	1
	SF-7 Cuber	8
	BTO-6	2
	Overhead Block Transfer	3
	Depalleter	2
	AF-7 Block Pusher	2
5	Concrete Products Machine	1
6	Concrete Products Machine	1
7	Concrete Products Machine	2
8	Besser-Matic	4
9	Besser-Matic	4
10	Pallet Transport System	4
11	LSC-40	4
	Overhead Block Transfer	4
12	Conveyors	6
13	SF-7 Cuber	8
14	AF-7 Block Pusher	2
	Pallet Transport System	4
15	All Machines	1
	All Panels	1
16	SF-7 Cuber	3
	AF-7 Block Pusher	2
	Slat Conveyors	2
17	Skiploader [***Available in 1998***]	6
18	Generic Falling Hazard [***Available in 1998***]	2
19	Skiploader [***Available in 1998***]	2
20	Skiploader [***Available in 1998***]	2
21	Skiploader [***Available in 1998***]	1

To order safety decals, contact your local Besser representative or the Besser Central Order Department.
Thank you!

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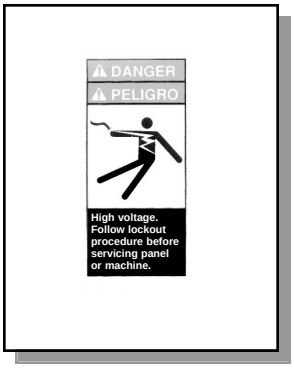

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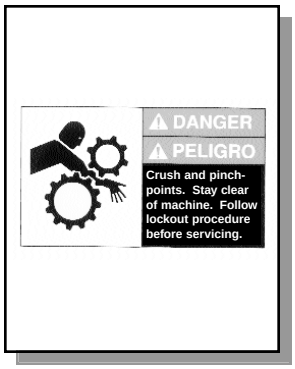

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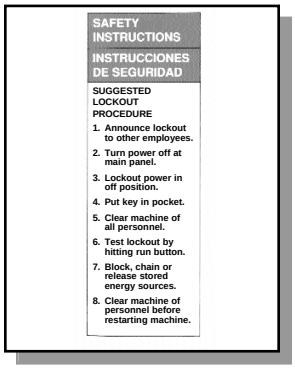

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SAFETY SIGNS

ELECTRICAL DATA

20 HP Skiploader Motor

Plant Power Supply	380 volt, 3 phase, 50 hz
Total Horsepower	20
Total Kilowatts	14.91
Control Panel Transformer	500 volt-amps
Total Amp Load	35.62
Recommended Branch Circuit Distribution Switch	60 amp
Recommended Branch Circuit Fuse (FRS-R)	50 amp
Recommended Branch Feeder (THHN)	no. 8 AWG [8.4 sq. mm]
Recommended Branch Circuit Feeder Conduit	0.5 inch [12 mm]
Short Circuit Interrupting Capacity	200,000 AIC

Device (Approximate Load)	Horsepower	Kilowatts	Amperes
Skiploader Motor	20.00	14.91	34.30

Electrical Data Notes:

For safety purposes, Besser Company requires that this equipment be connected to a lockable electrical disconnect.

CAUTION:

To comply with Articles 110-9 and 110-10 of the National Electrical Code:

- The customer shall supply a branch circuit protective device to feed this control panel.
- The protective device shall have a short circuit interrupting rating of no less than the available short circuit current. (Besser Company recommends the use of protective devices with interrupting ratings of no less than 200,000 amps rms symmetrical.)
- See table above for the recommended protection.

Failure to comply with these guidelines may result in a rupture of the protective device while attempting to clear a fault.

SKIPLOADER 120
SPECIFICATIONS

Skiploader

Electrical-mechanical bucket loader that transports mixed concrete from the mixer system to the mixed material hopper.

APPROXIMATE SHIPPING WEIGHT: 24,000 pounds [10909 kg]

MAXIMUM BUCKET SPEED: 20.5 feet per minute [6.2 mpm]

BUCKET:

Maximum weight capacity: 12,000 pounds [5455 kg]
Maximum volume capacity: 120 cubic feet [3.4 m3]

ELECTRIC MOTOR HORSEPOWER: 20 horsepower [14.9 kw]

DIMENSIONS: See Figure A

OPERATING CONDITIONS: Besser machinery and equipment is designed to comply with the essential health and safety regulations (EHSR) that apply to directives which are applicable to an industrial environment.
Buyer shall utilize this equipment in a manner consistent with its design and only in an industrial environment.

OPERATING RANGES: Here are the normal operating ranges for machine sensors (limit, proximity) and control devices contained within the control panels.

Ambient operating temperature range: 32° to 131°F [0° to 55°C]

Humidity range: 5 to 95% (non-condensing)

Line voltage: 85 to 132 volts – AC 50/60 Hz

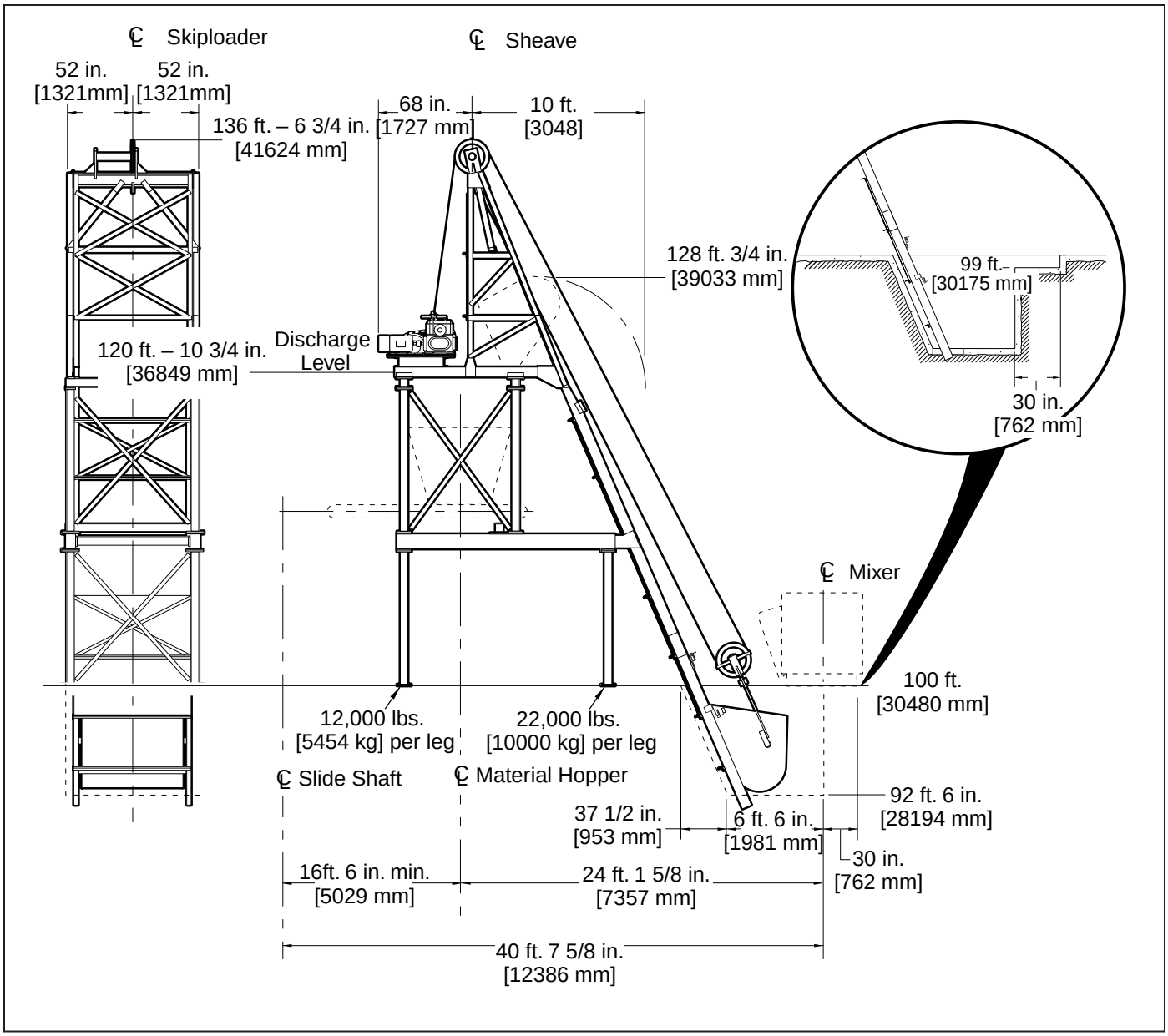


Figure A *Skiploader Dimensions*

SECTION 1
OVERVIEW

1.1 GENERAL DESCRIPTION

The Besser Skiploader transports mixed concrete from the floor level to a mixed material hopper. The hopper then feeds the concrete products machine. All Skiploader functions are automatically controlled by the batch processing system and other external equipment.

This guide will help you install the Skiploader safely and successfully.

1.2 EQUIPMENT OVERVIEW

Figure 1.1 provides an overview of Skiploader components.

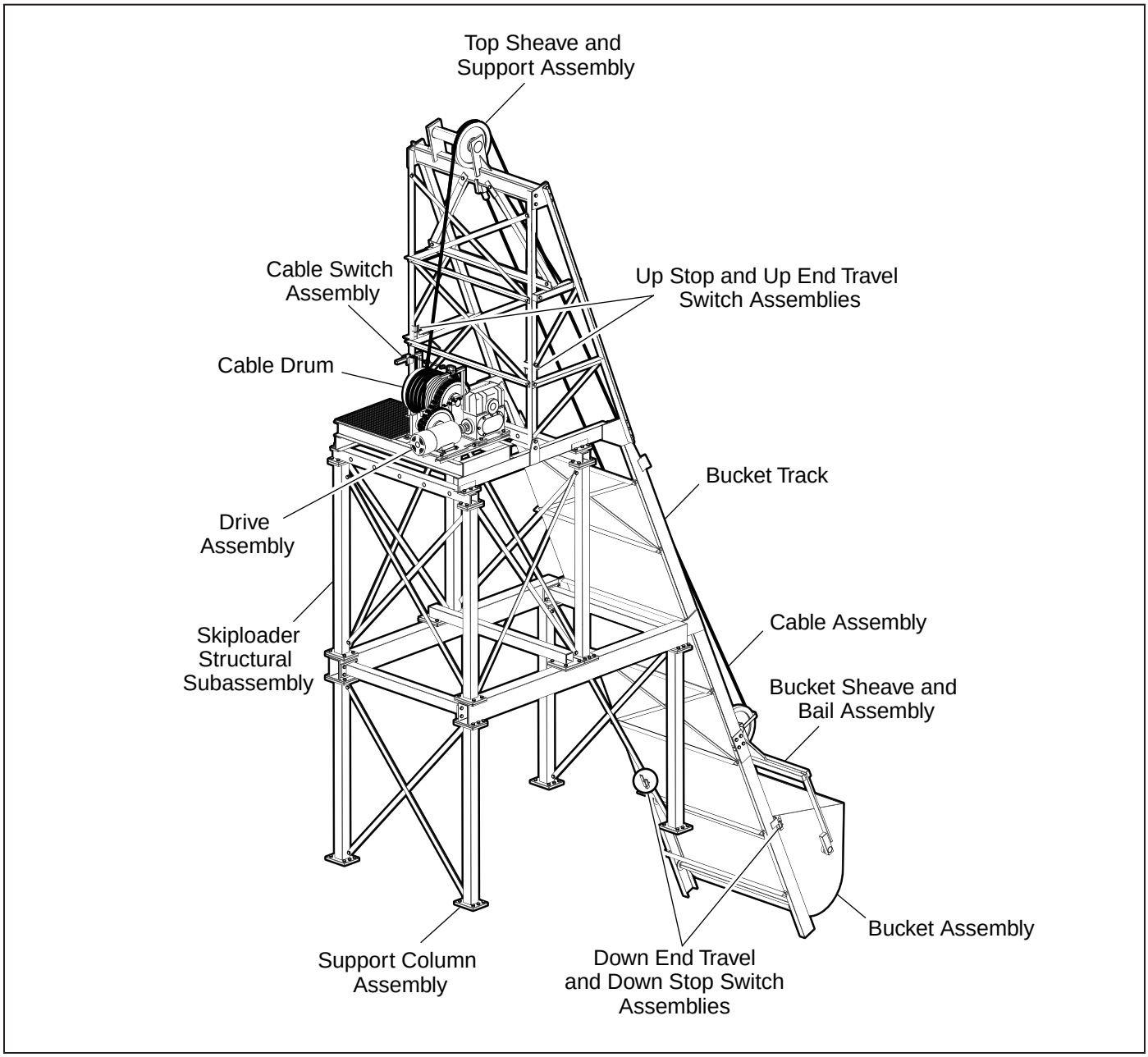


Figure 1.1 *Skiploader Main Context View*

1.2.1 Skiploader Dimensions

Figure 1.2 provides Skiploader dimensions:

NOTE:
The electrical panel and remote control station must be located within 50 feet [15.24 M] of the material hopper centerline. Also, the remote emergency stop must be mounted on the Skiploader drive. For further information, refer to Besser drawing 471395.

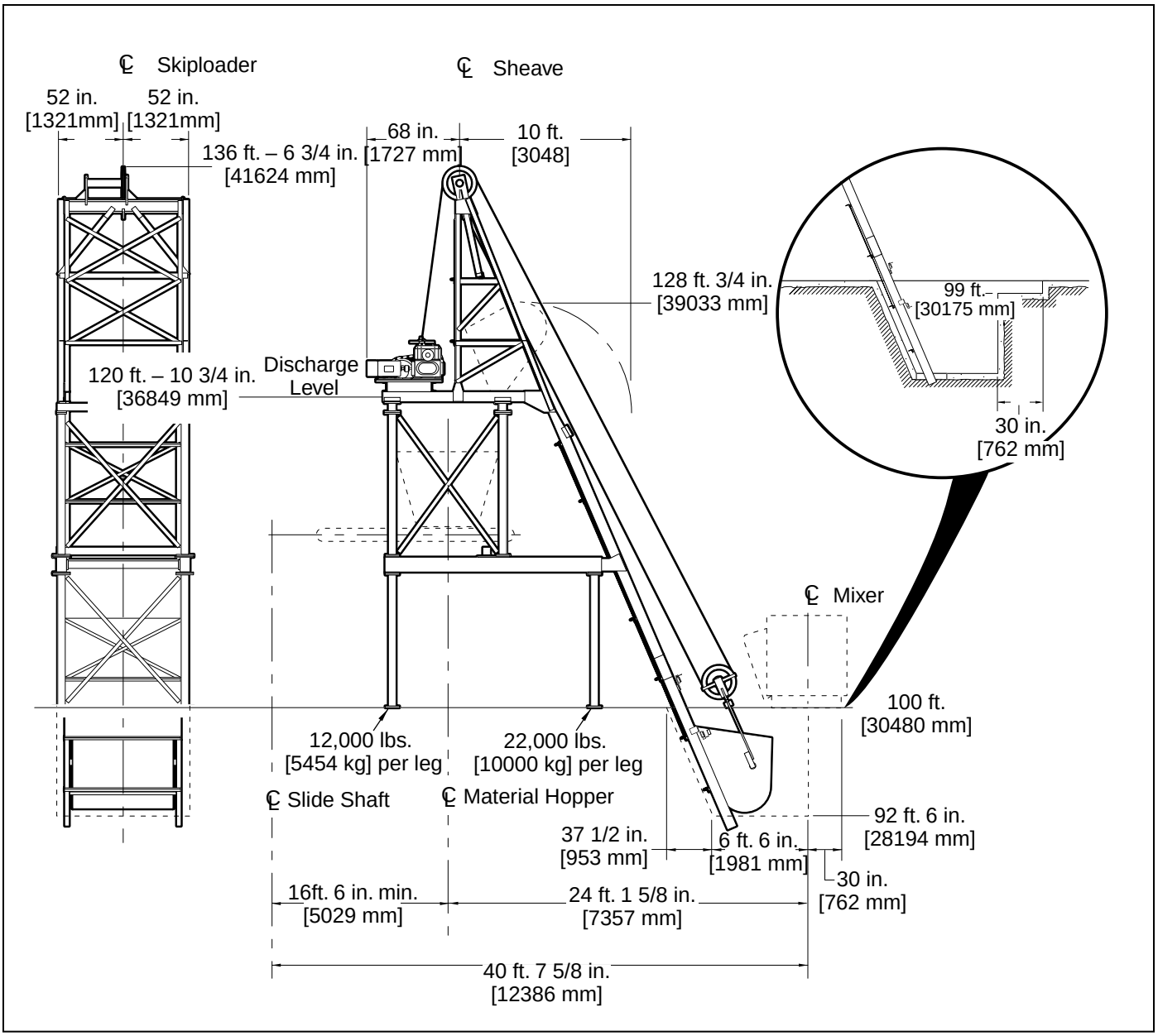


Figure 1.2 *Skiploader Dimensions*

1.3 SKIPLOADER INSTALLATION AT A GLANCE

The Skiploader installation process includes the following four steps:

1. Site Preparation
   - Electrical supply (Section 2.1)
   - Alignment and mounting locations (Section 2.2)
   - Bucket pit preparation (Section 2.3)
2. Mechanical Installation
   - Tier A (Section 3.2.3)
   - Tier B (Section 3.2.4)
   - Tier C (Section 3.2.5)
3. Electrical Cable Routing (Section 3.3)
4. Limit Switch Installation
   - Down End Travel Limit Switch (Section 3.4.1)
   - Load Position Down Stop Limit Switch (Section 3.4.2)
   - Unload Position Up Stop Limit Switch (Section 3.4.3)
   - Up End Travel Limit Switch (Section 3.4.4)
   - Cable switch (Section 3.5)
5. Ladders, Walkways and Guarding (Section 3.6)
6. Final Adjustments (Section 3.7)

SECTION 2
SITE PREPARATION

2.1 ELECTRICAL SUPPLY PREPARATIONS

It is essential that the Skiploader installation site have an adequate and correctly configured power supply.

Table below lists recommended protection for your installation.

20 HP Skiploader Motor

Plant Power Supply	380 volt, 3 phase, 50 hz
Total Horsepower	20
Total Kilowatts	14.91
Control Panel Transformer	500 volt-amps
Total Amp Load	35.62
Recommended Branch Circuit Distribution Switch	60 amp
Recommended Branch Circuit Fuse (FRS-R)	50 amp
Recommended Branch Feeder (THHN)	no. 8 AWG [8.4 sq. mm]
Recommended Branch Circuit Feeder Conduit	0.5 inch [12 mm]
Short Circuit Interrupting Capacity	200,000 AIC

DEVICE (APPROXIMATE LOAD)	HORSEPOWER	KILOWATTS	AMPERES
Skiploader Motor	20.00	14.91	34.30

CAUTION:
To comply with articles 110-9 and 110-10 of the National Electrical Code:
- Supply a branch circuit protective device to feed the control panel.
- The protective device shall have a short circuit interrupting rating of no less than the available short circuit current.
- Failure to do so could result in a rupture of the protective device while attempting to clear a fault.
- Besser Company recommends the use of protective devices with interrupting ratings of no less than 200,000 amps RMS symmetrical.

2.2 ALIGNMENT AND MOUNTING LOCATIONS

Figure 2.1 illustrates the proper position of mounting locations.

Besser recommends that you measure and mark equipment center lines in the following sequence:

1. Block machine center line
2. Block machine slide shaft center line
3. Mixed material hopper center line
4. Mixer centerline
5. 1 inch [25 mm] anchor bolts off block machine centerline and mixed material hopper center line.

Anchor bolt locations A, B, C, and D must be flat within a tolerance of .03 inches [1 mm].

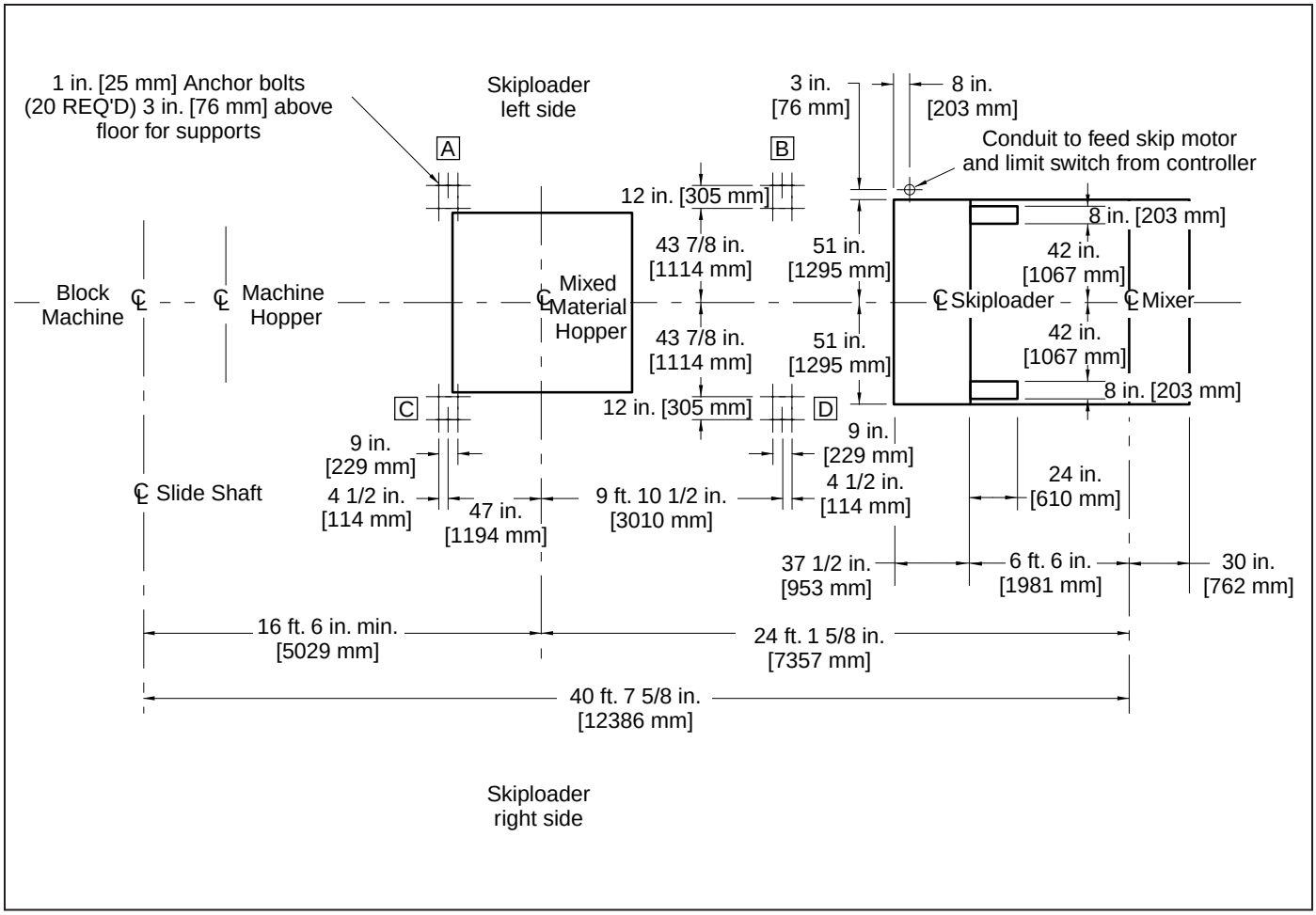


Figure 2.1 *Alignment and Mounting Locations*

2.3 PREPARING AND INSTALLING THE BUCKET PIT

Figure 2.2 shows the dimensions and specifications for the Skiploader bucket pit.

NOTE:
The section of the bucket pit is left open to allow space for the bucket tracks. After the tracks are in place and the Skiploader frame is final assembled, this space is filled with poured concrete.

NOTE:
It is the customer's responsibility to provide additional guarding for the Skiploader bucket pit (and other equipment) as necessary to meet all safety code requirements.

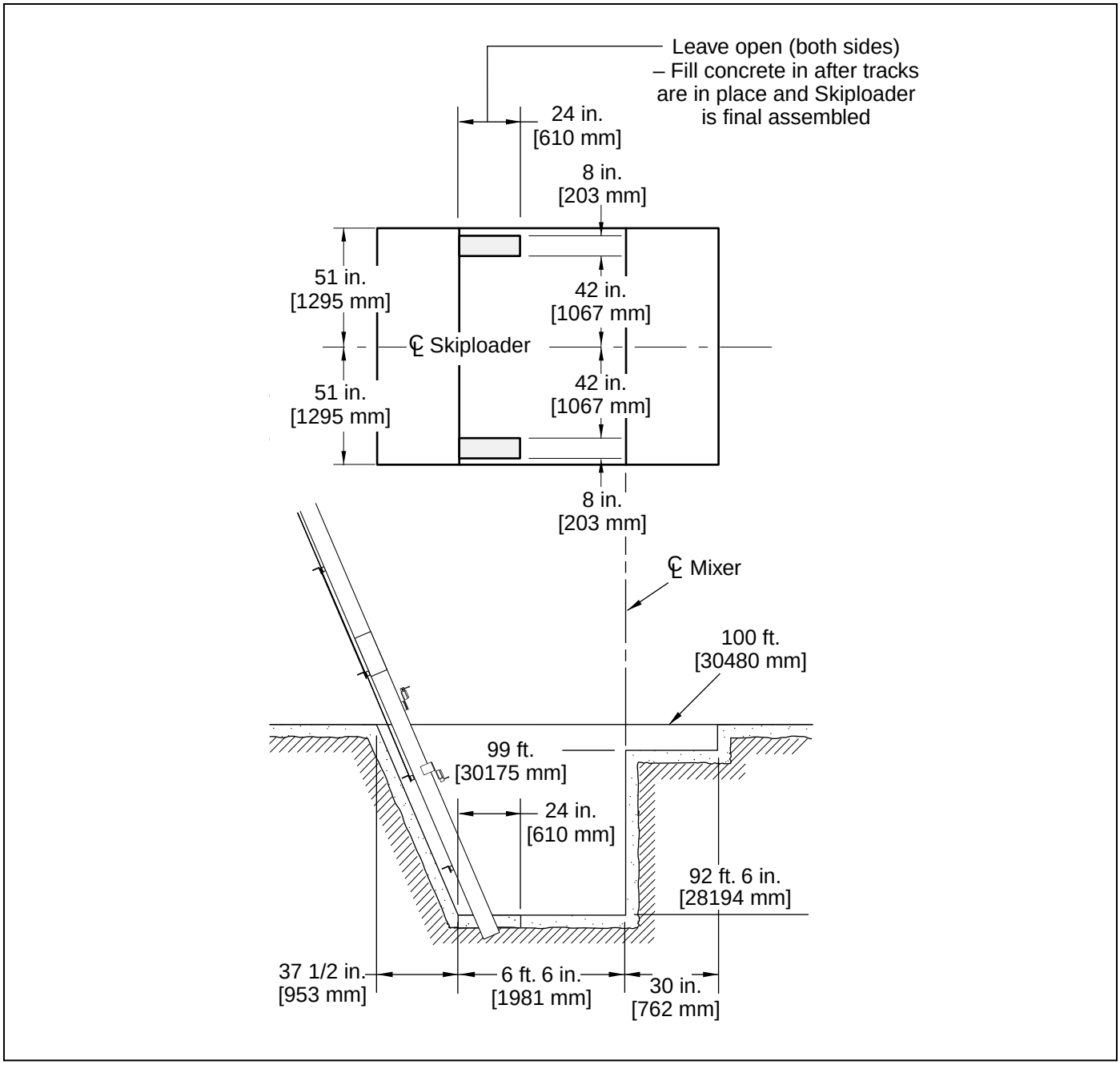


Figure 2.2 *Preparing the Bucket Pit*

SECTION 3
INSTALLATION

3.1 INSTALLATION OVERVIEW

Refer to Figure 1.3 for a simplified overview of the entire installation process. Once the site is fully prepared, you are ready to proceed with the mechanical and switch installation.

Besser recommends that the customer use a professional rigging crew to hoist heavy Skiploader components (including the bucket and gear motor). The method chosen for hoisting this equipment will vary depending upon available rigging equipment and the plant layout.

The heavy-duty rigging system must have a lifting capacity of 10,000 pounds [4545 kg] to ensure the safety of plant personnel during Skiploader installation.

WARNING:
Failure to use a professional rigging crew and equipment may result in serious personal injury or property damage.

3.2 MECHANICAL INSTALLATION

The mechanical installation is a "bottom-up" process. The three parts to the process are:

- Tier A (bottom)
- Tier B (middle)
- Tier C (top)

3.2.1 Bolt Torque Specifications

Torque all nuts to snug tight condition. This condition is acheived by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench. Follow Table 3.1 for final tightening.

NOTE:

- Remove paint and all foreign material from the mating surfaces at bolted joints.
- If a structural bolt is final tightened and then removed, a new structural bolt/nut must replace the used bolt/nut.

ADDITIONAL TIGHTENING (NUT ROTATION) AFTER "SNUG TIGHT" CONDITION:

Bolt Size			
Diameter	**Length**	**Nut Rotation**	**Tolerance**
3/4 in. [19 mm]	Thru 3 in. [76 mm]	1/3 Turn	+/- 30 Degrees
	3 1/2 in. – 6 in. [89 mm – 152 mm]	1/2 Turn	+/- 30 Degrees
	6 1/2 in. – 12 in. [165 mm – 305 mm]	2/3 Turn	+/- 45 Degrees
1 in. [25 mm]	Thru 4 in. [102 mm]	1/3 Turn	+/- 30 Degrees
	4 1/2 in. – 8 in. [114 mm – 203 mm]	1/2 Turn	+/- 30 Degrees
	8 1/2 in. – 12 in. [216 mm – 305 mm]	2/3 Turn	+/- 45 Degrees

Table 3.1 *Bolt Torque Specifications*

3.2.2 Skiploader Assembly (Full View)

Figure 3.1 illustrates the full Skiploader assembly. Refer to the Besser installation drawings provided with your equipment for additional information.

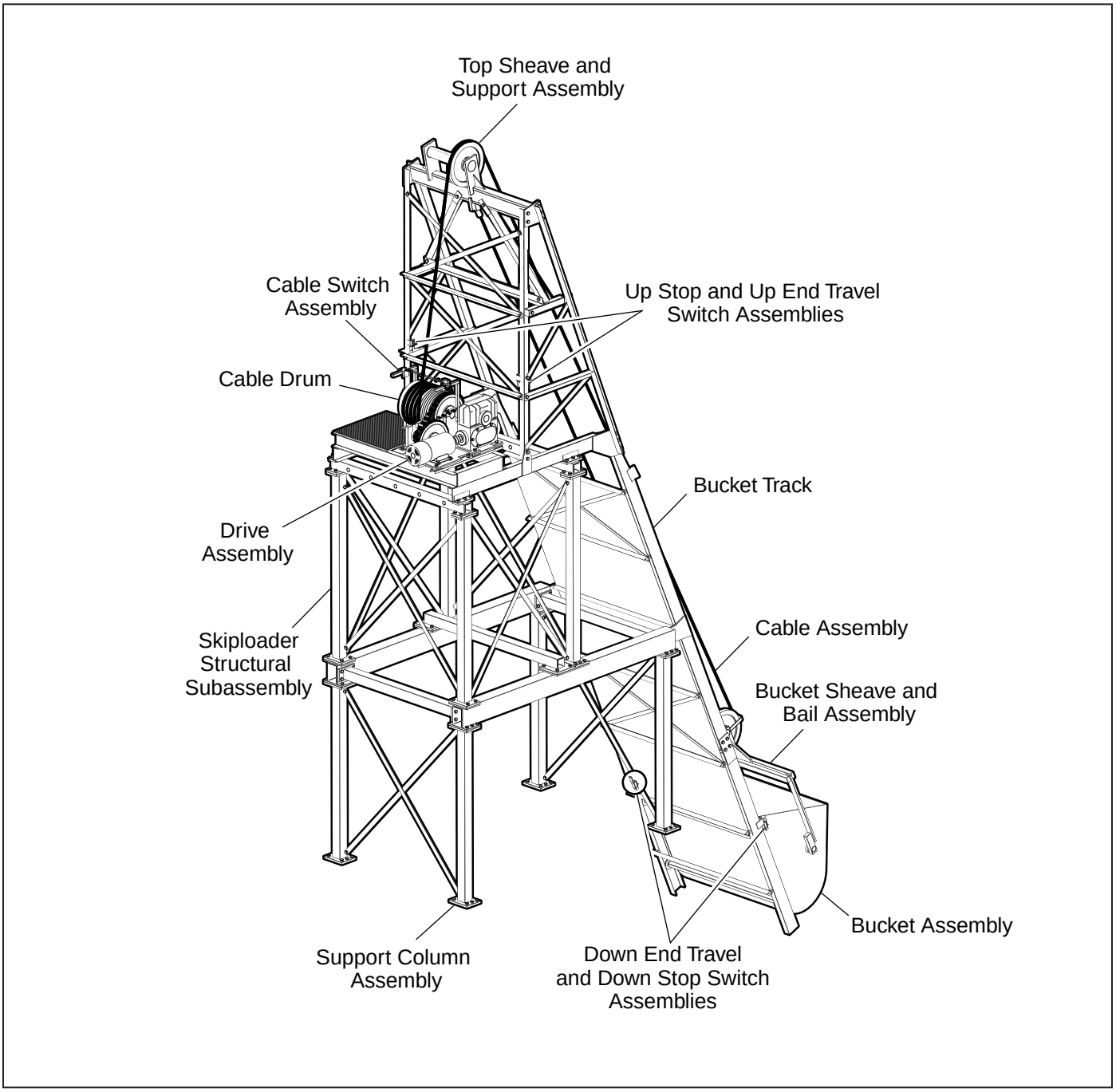


Figure 3.1 *Skiploader Assembly – 471395*

3.2.3 Tier A Assembly

Tier A comprises the lower support columns, cross braces, beam, and beam supports. To assemble Tier A, refer to Figure 3.2 and Besser drawings 647311, 471395 and 452681 as you perform the following steps:

1. Install the support columns and cross bars.
2. Install the beams and beam supports.
3. Install anchor bolts – note loads on support columns.

NOTE:
Brace columns and beams as needed. Bracing material should be adequate to support the weight of the Skiploader components. Besser strongly recommends that you hire a professional rigging crew to assemble all three Skiploader tiers.

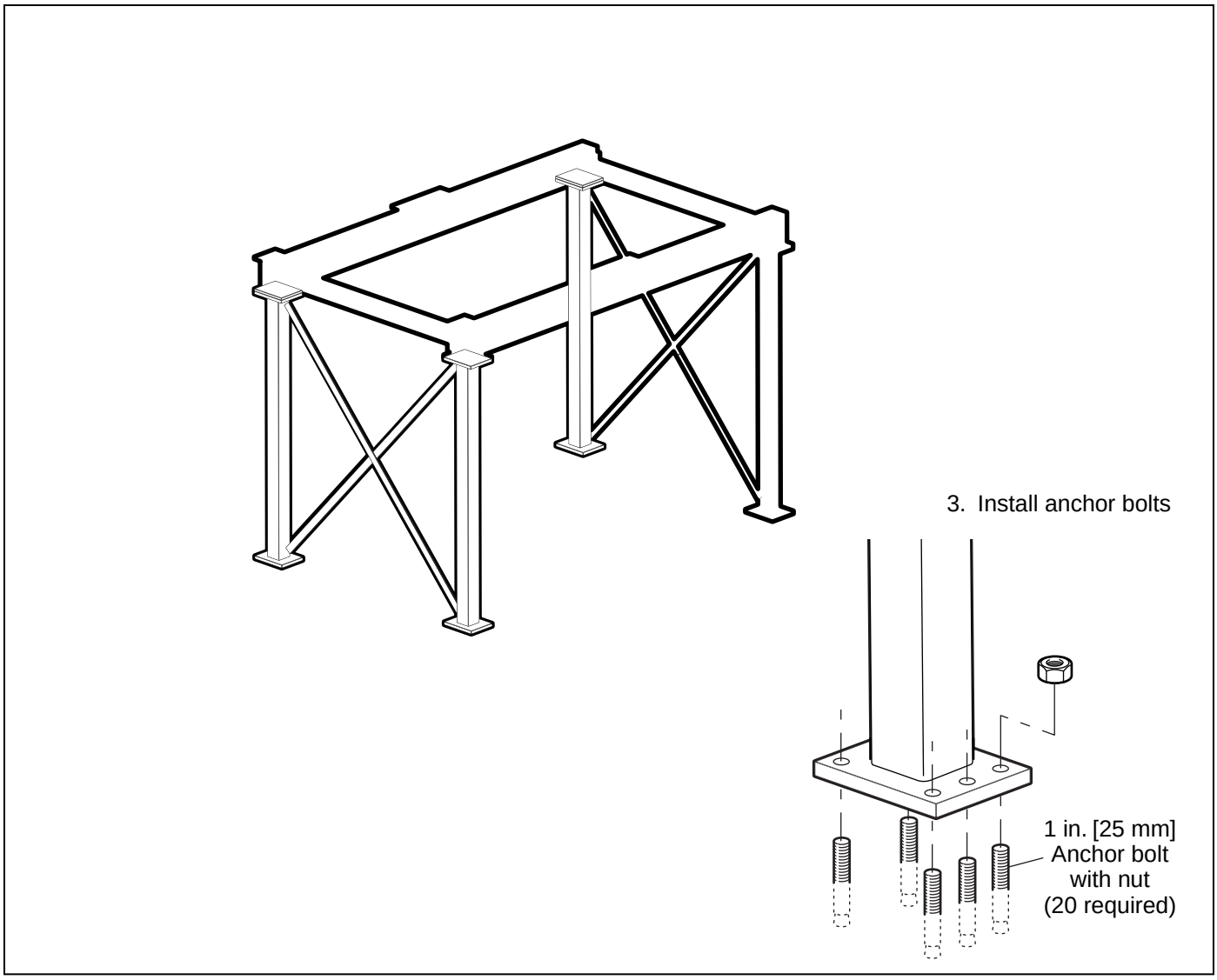


Figure 3.2 *Tier A Supports and Columns*

3.2.4 Tier B Assembly

Tier B comprises the middle support columns, cross braces, hopper support beams, and bucket dump tracks. Refer to Figures 3.3 through 3.6 and Besser drawings 452681, 647311 and 471395 as you assemble the following Tier B components:

- Support and columns
- Bucket tracks and guards
- Bucket assembly

3.2.4.1 Support and Column Assembly

Assemble the support beams, columns and horizontal bucket track as shown in Figure 3.3:

1. Install the metering belt support beam.
2. Install the second level support columns and bar braces.
3. Install the hopper support beams.
4. Install the horizontal bucket tracks.

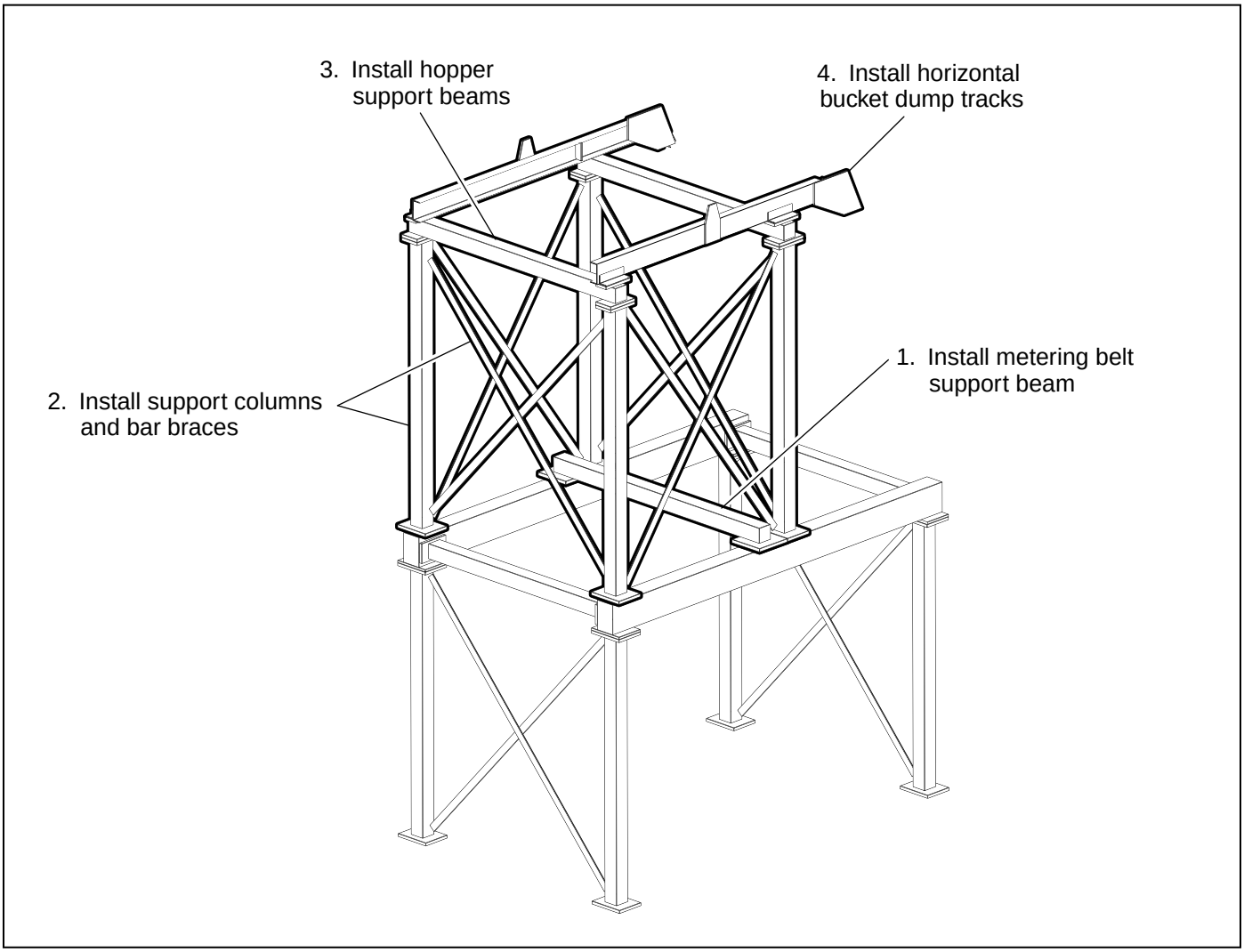


Figure 3.3 *Tier B Supports, Columns and Dump Tracks*

3.2.4.2 Bucket Tracks and Guards

Assemble the bucket tracks, guard plates, spreader angles and crossbars as shown in Figure 3.4:

1. Install the upper bucket tracks.
2. Install the lower bucket tracks.
3. Install the guard plates, angle braces and bar braces.

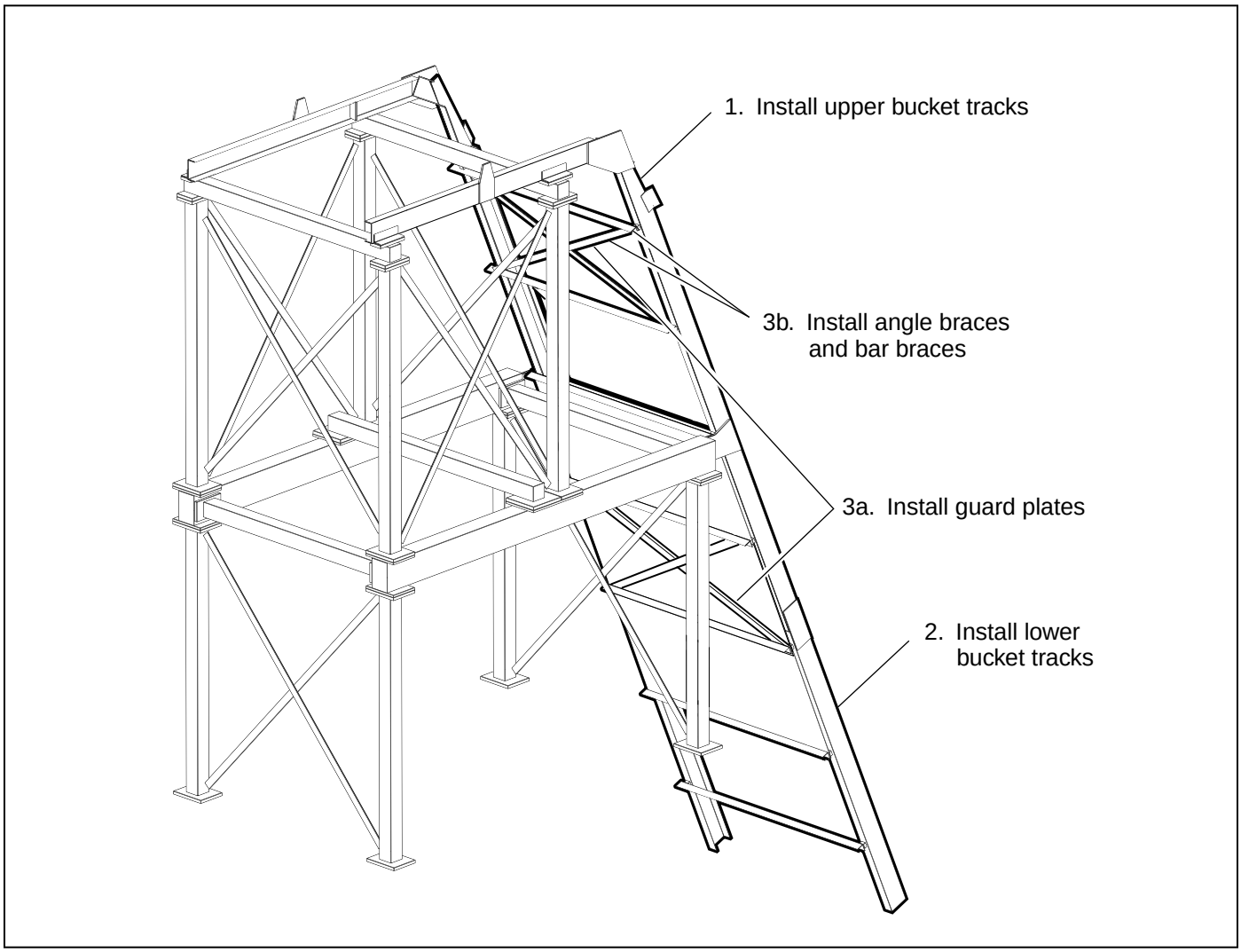


Figure 3.4 *Tier A and B Bucket Tracks and Guards*

3.2.4.3 Bucket Assembly

Refer to Besser drawing 471395 as you install the bucket.

1. Secure bracket to bail (Fig. 3.5).
2. Position the bucket rollers in the upper tracks, and lower the bucket assembly into place (Figures 3.5 and 3.6).

WARNING:
To avoid serious personal injury and/or equipment damage, Besser strongly recommends using professional rigging equipment and an experienced rigging crew to hoist the bucket assembly into place.

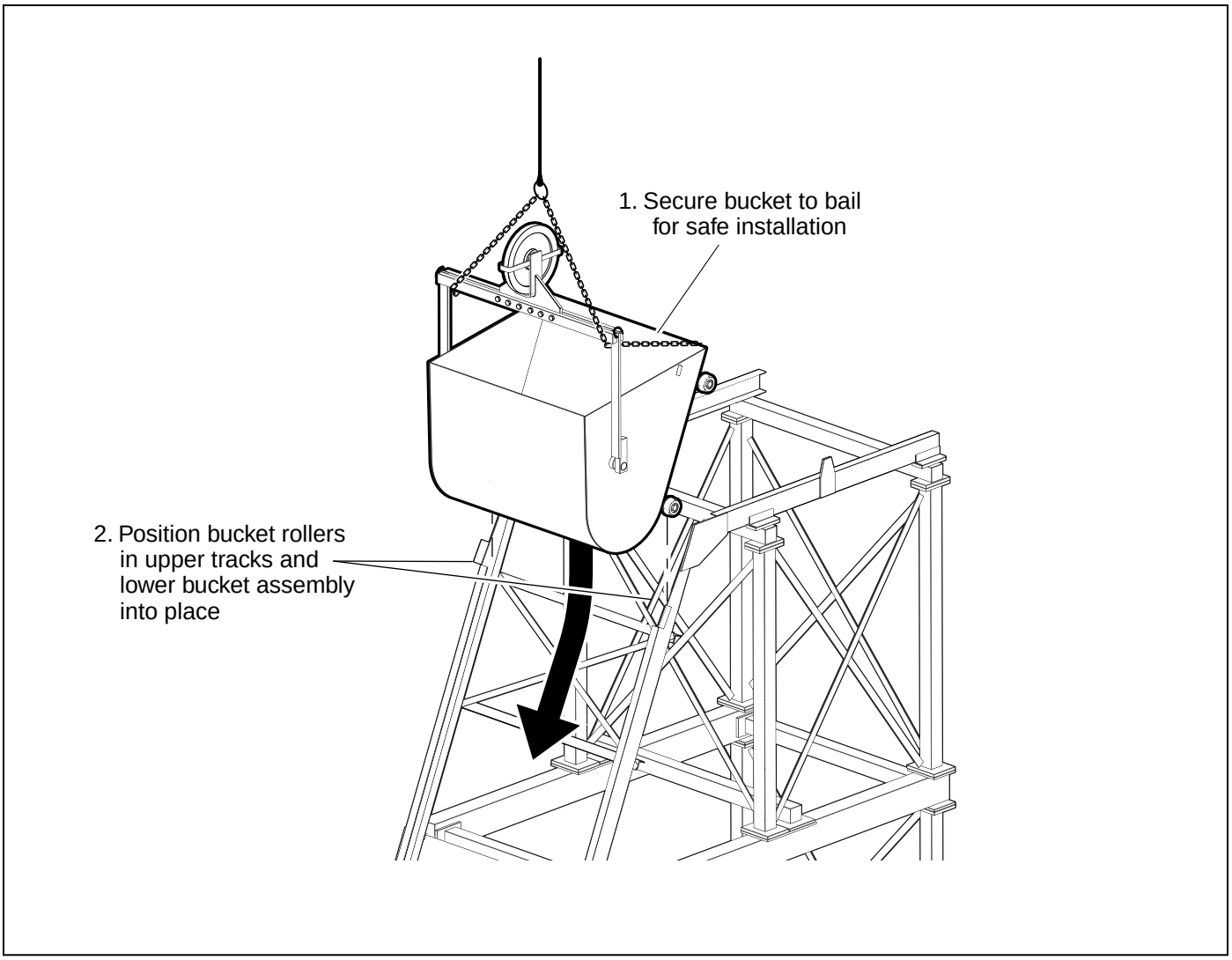


Figure 3.5 *Lifting and Installing the Bucket Assembly*

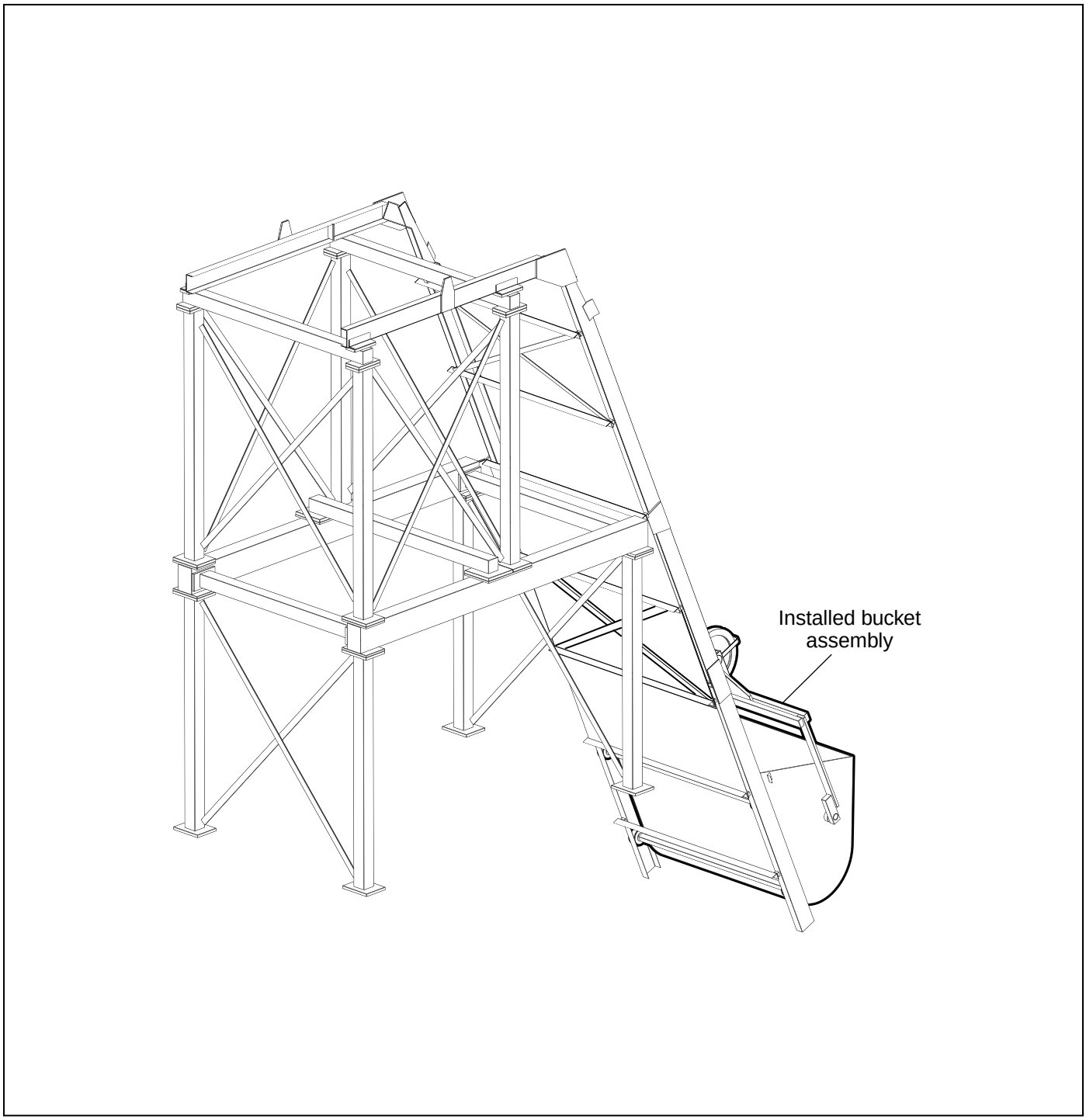


Figure 3.6 *Bucket Assembly – Final Position*

3.2.5 TIER C ASSEMBLY

Tier C comprises the angles, uprights, bar braces, angle braces, top sheave and support, drive motor and cable. To assemble Tier C, refer to Figure 3.7 and Besser drawing 452681 as you perform the following steps: (Brace as required)

1. Install angle uprights, left and right bar braces and angle braces.
2. Install angle braces and bar braces.
3. Install top sheave and support.
4. Install the top sheave support bracing.

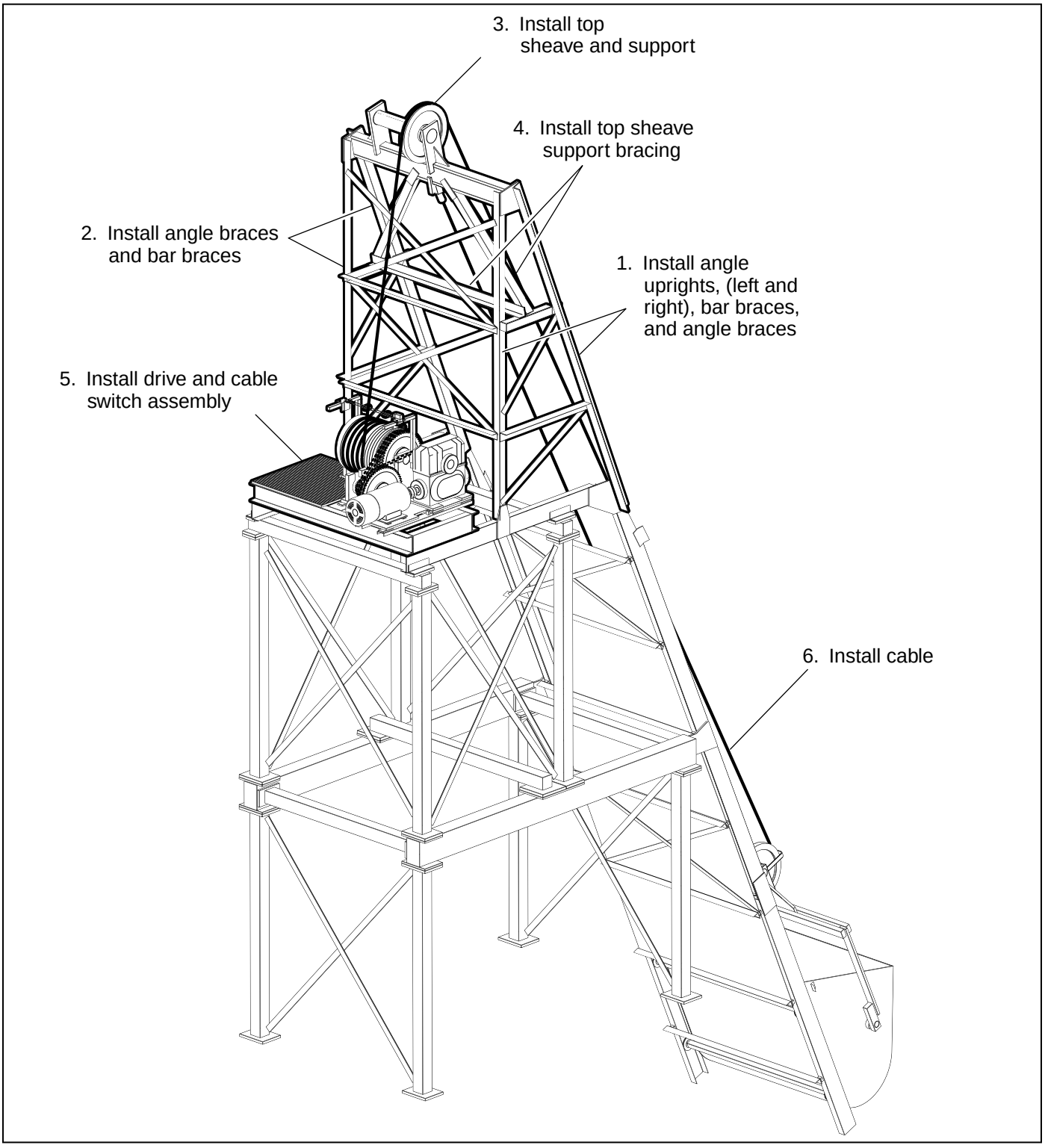


Figure 3.7 *Tier C Supports, Braces, Drive and Cable*

5. Install drive and cable switch assembly.

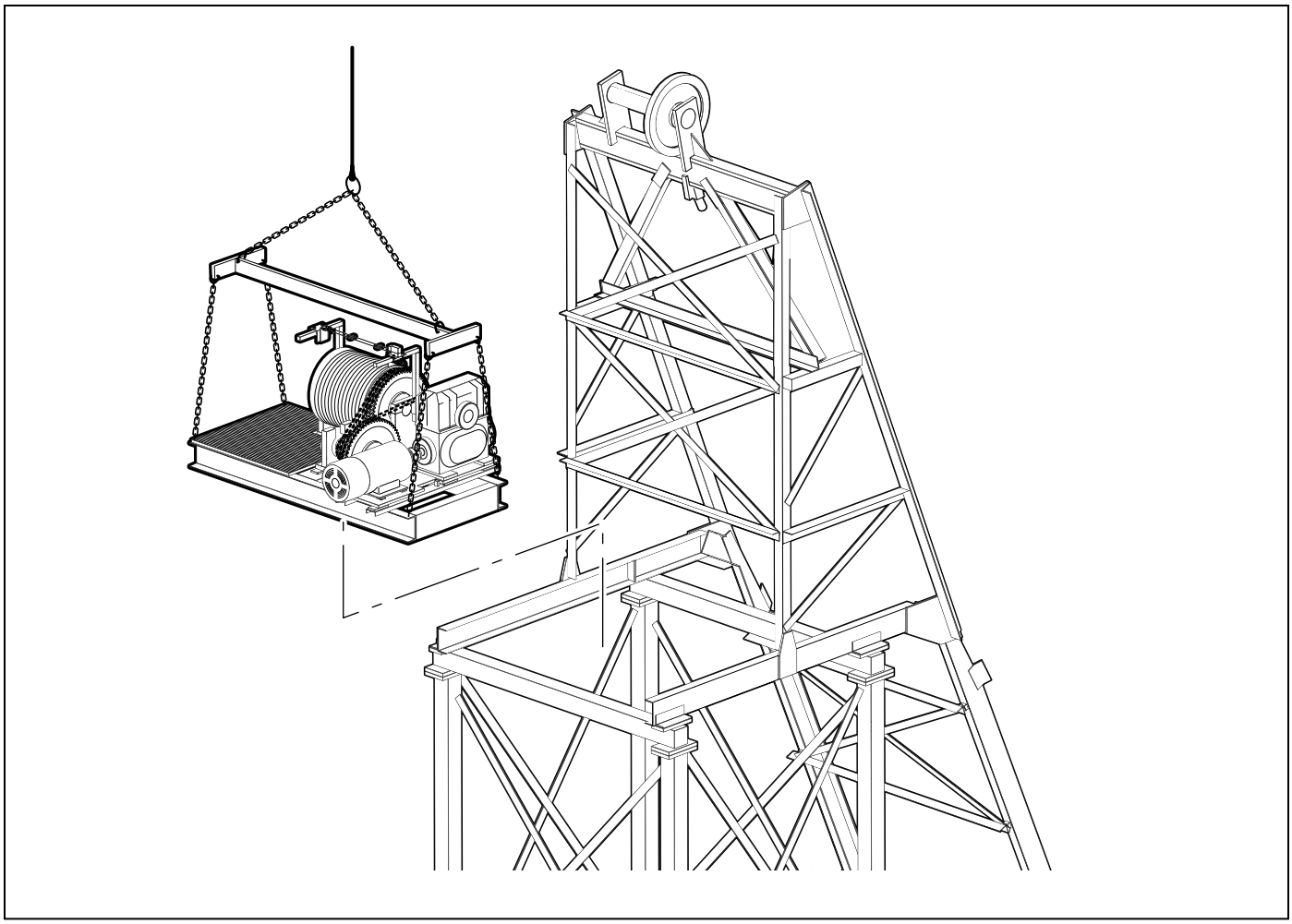


Figure 3.8 *Install Drive Assembly*

6. Install the cable as follows:
   - Secure the cable to the underside of the top sheave support as shown in Figure 3.9.
   - Thread the cable down through the sheave on the bucket bail and back up over the sheave on the top sheave support.
   - Wrap the cable twice around cable drum on the drive assembly and thread it under the clamp on the drum. See Figure 3.10.
   - There must be a full snug wrap between each clamp groove.
   - Confirm that the cable is wrapped in the direction shown in Figure 3.10, and make sure that the end of the cable projects at least 4 inches [102 mm] from clamp.
   - Secure the cable clamp with grade 5, 1 inch [25 mm] bolts. Use Loctite #242 and torque to 600-650 ft. lbs. [813-881 N•m]

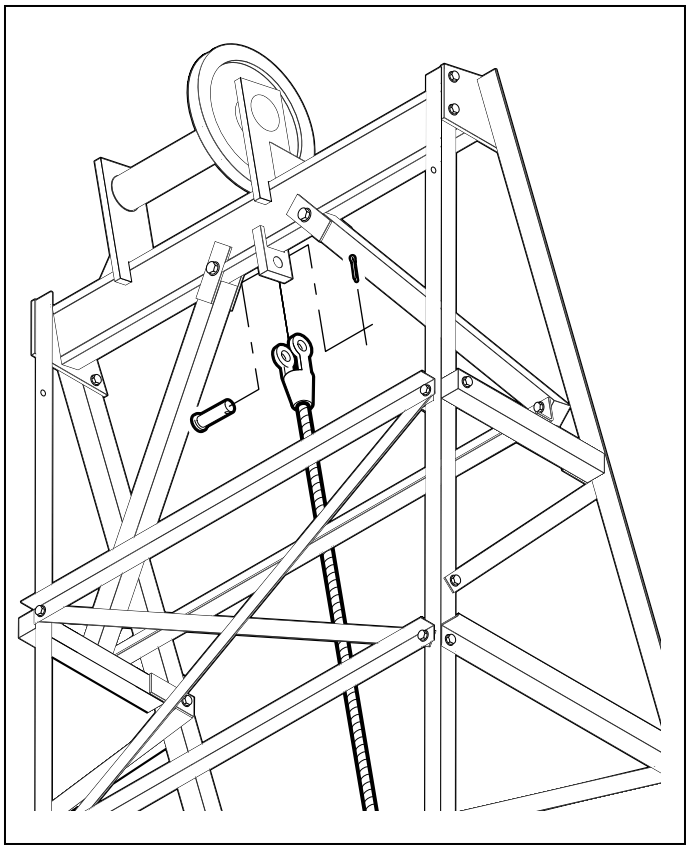
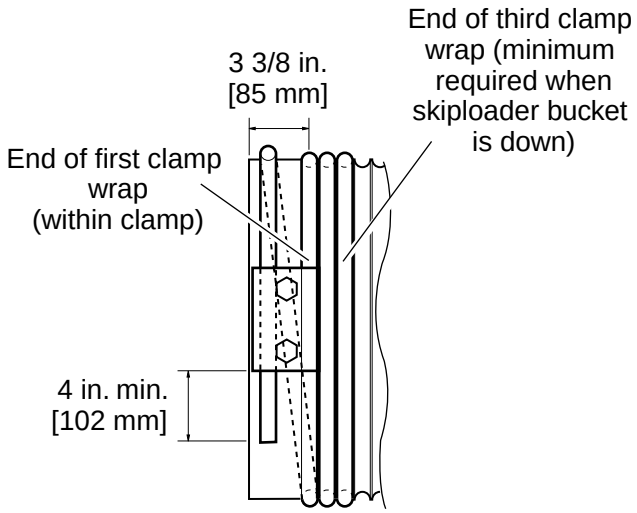
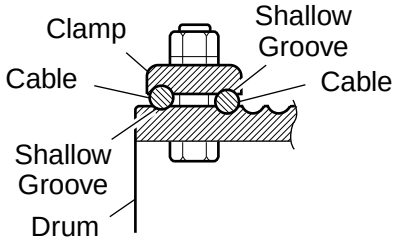


Figure 3.9 *Install Cable – Stationary End*



Note:
There must be a full snug wrap between each clamp groove as shown. Use Loctite #242 (Besser part # 103245) on clamp fasteners.



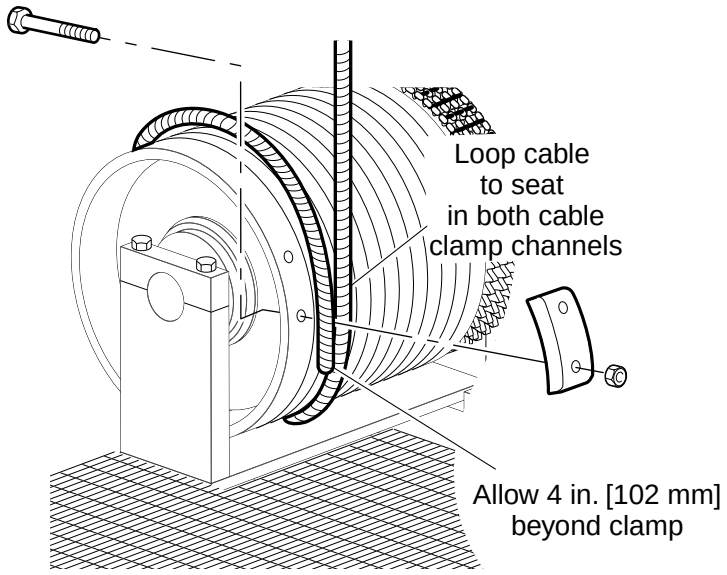


Figure 3.10 *Install Cable to Drum*

3.3 ELECTRICAL ROUTING AND POWER SUPPLY

Install a conduit to feed the motor/drive assembly and limit switches from the controller as shown in Figure 3.11.

NOTE:
Make sure that you have established an adequate and correctly configured power supply. Refer to Section 2.1 Electrical Supply Preparations.

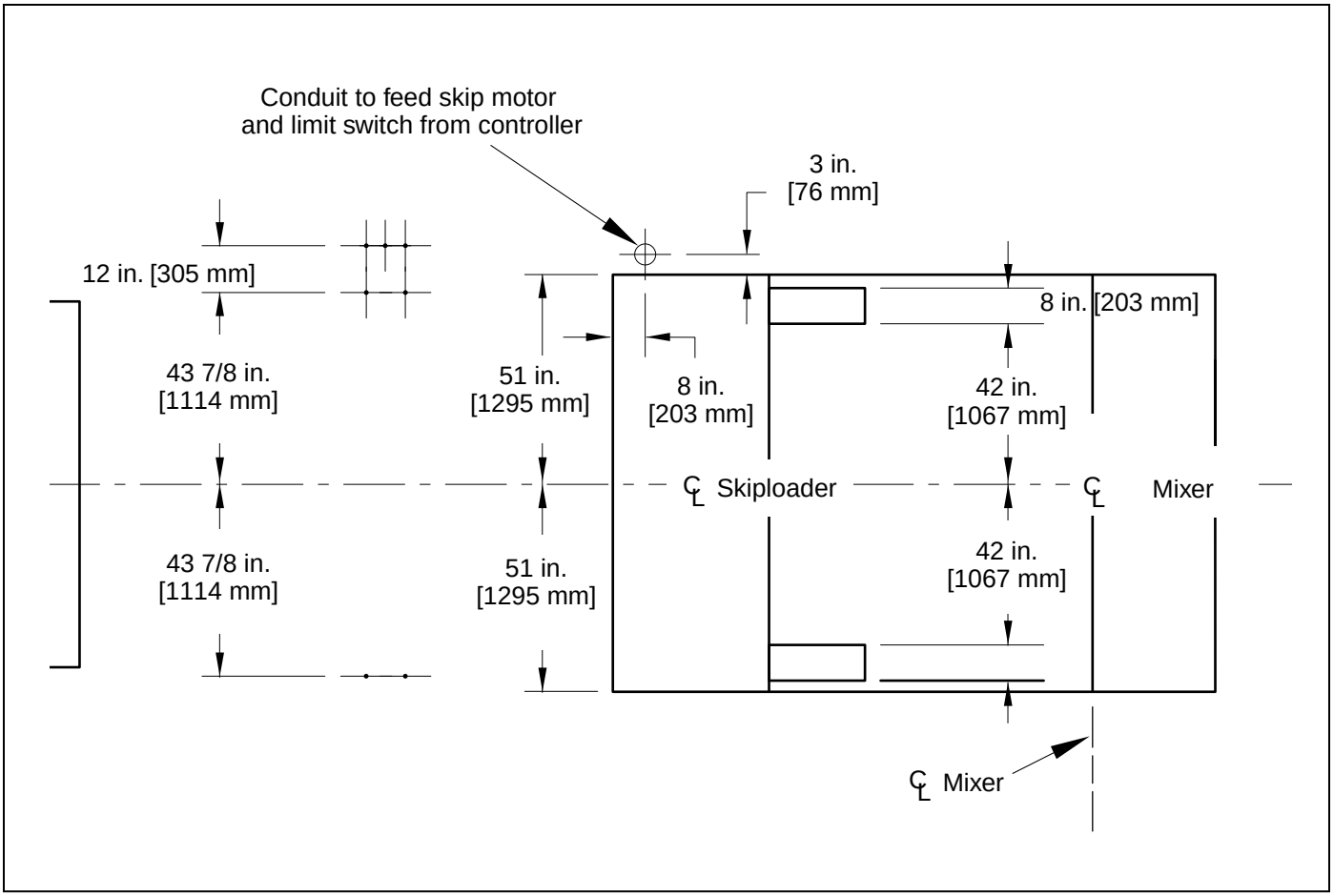


Figure 3.11 *Power Supply Routing at Base*

3.4 SWITCH INSTALLATION

Mount the Skiploader limit switches. Figure 3.12 indicates switch locations. Refer to the Besser installation drawings provided with your equipment for detailed switch placement information.

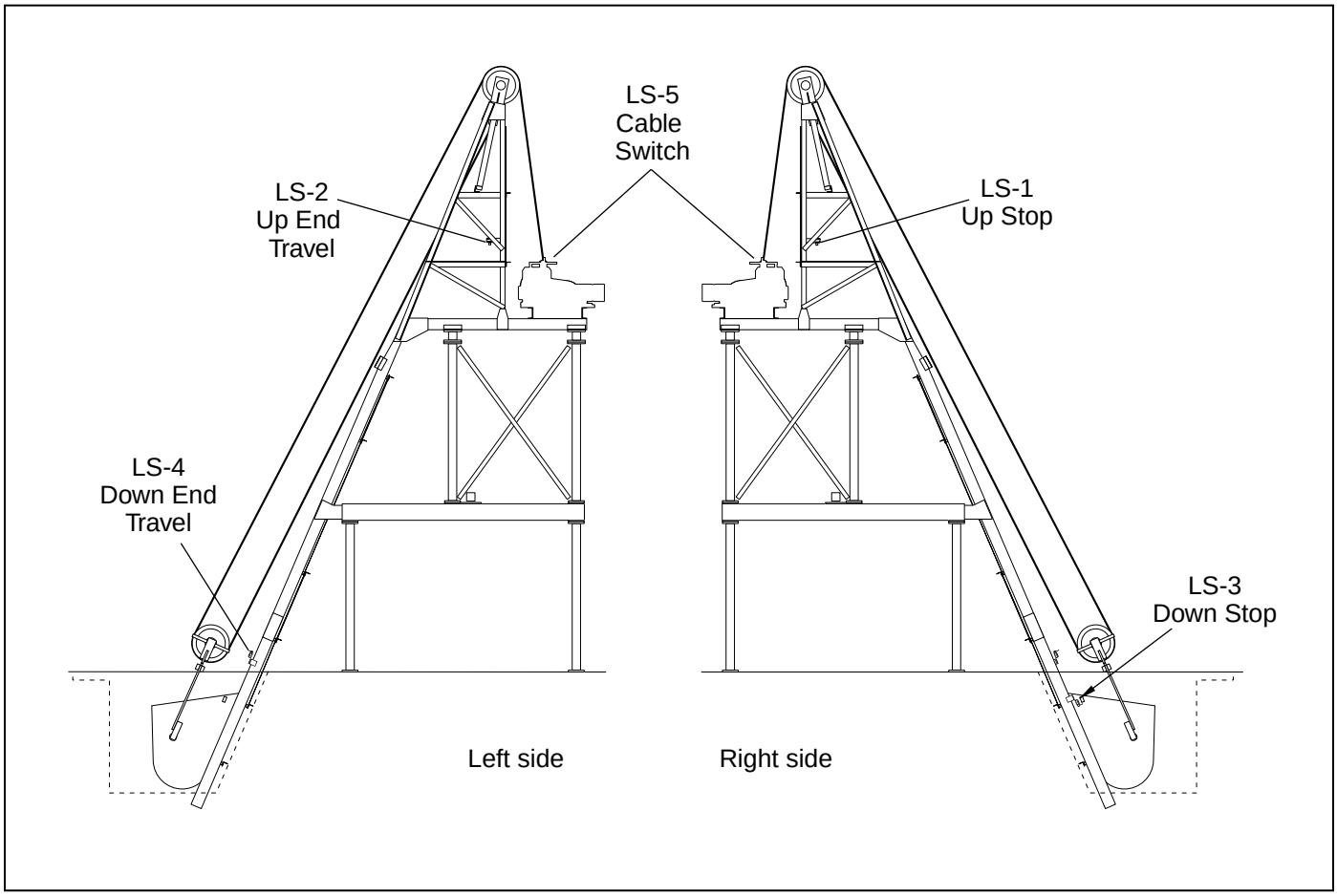


Figure 3.12 *Switch Locations*

3.4.1 Down End Travel Limit Switch

The down end travel limit switch (LS-4) is a safety switch that prevents the bucket from ascending if the down stop switch fails or is not tripped. Refer to Figure 3.13.

3.4.2 Load Position Down Stop Limit Switch

The down stop limit switch (LS-3) indicates to the batching system that the bucket is in the down position, ready to receive material. Refer to Figure 3.13.

3.4.3 Unload Position Up Stop Limit Switch

The Up Stop Limit Switch (LS-1) indicates to the batching system that the bucket is in the UP position. Refer to Figure 3.14.

3.4.4 Up End Travel Limit Switch

The Up End Travel Limit Switch (LS-2) is a safety switch that prevents the bucket from over-travel in the up direction if the up stop limit switch fails or is not tripped. Refer to Figure 3.15.

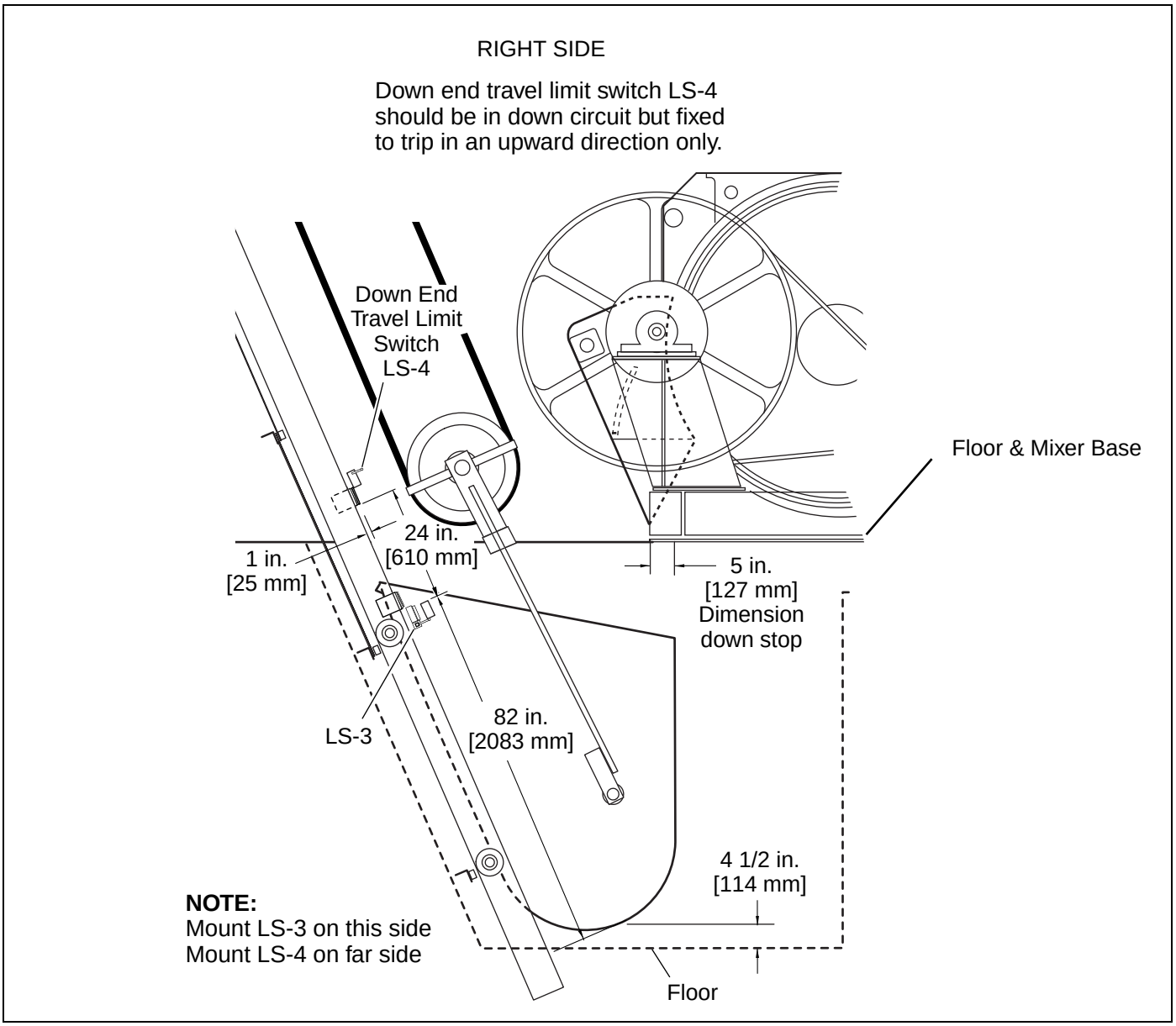


Figure 3.13 *Load Position Down Stop and Down End Travel Limit Switches*

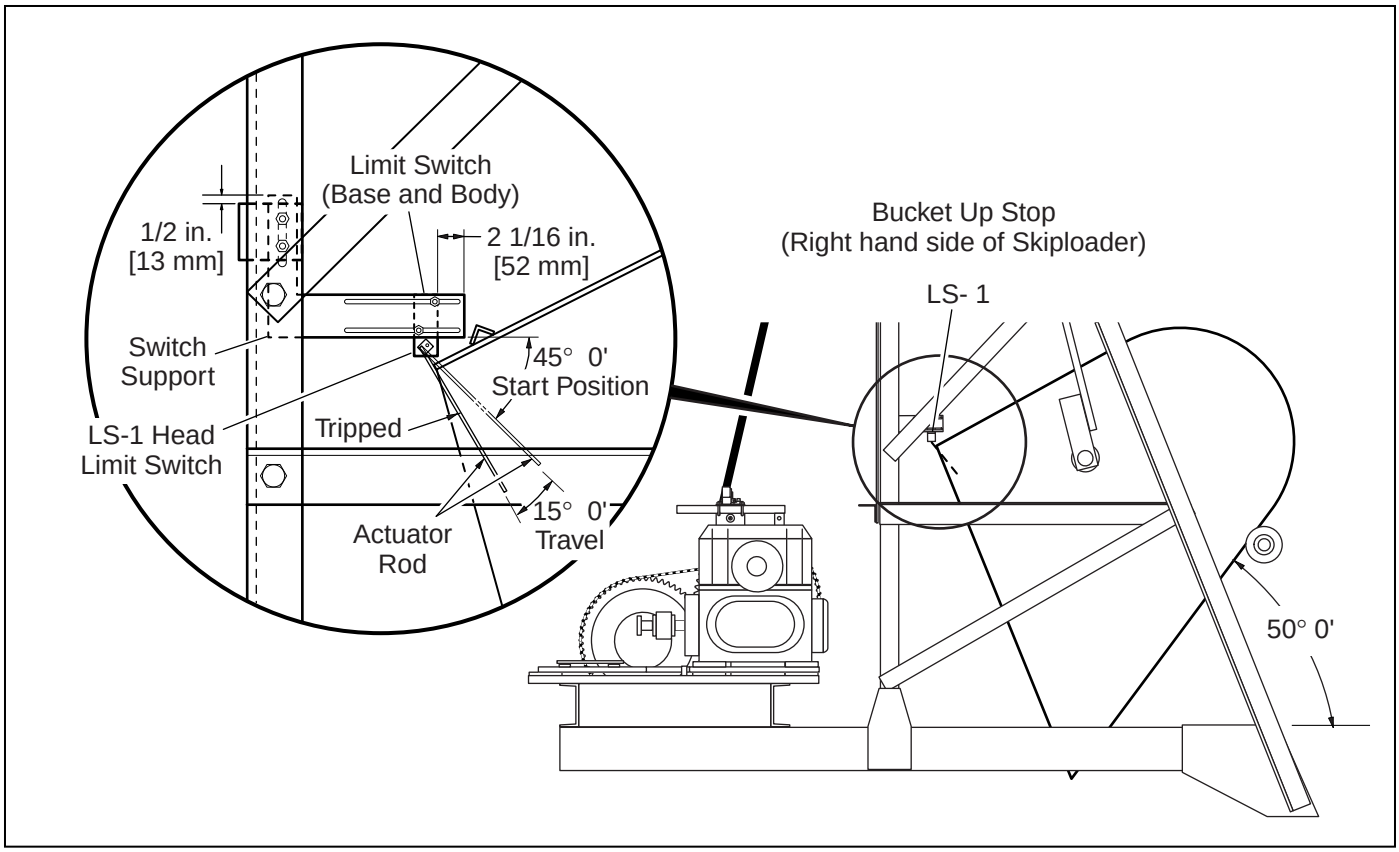


Figure 3.14 *Up Stop Limit Switch – LS-1*

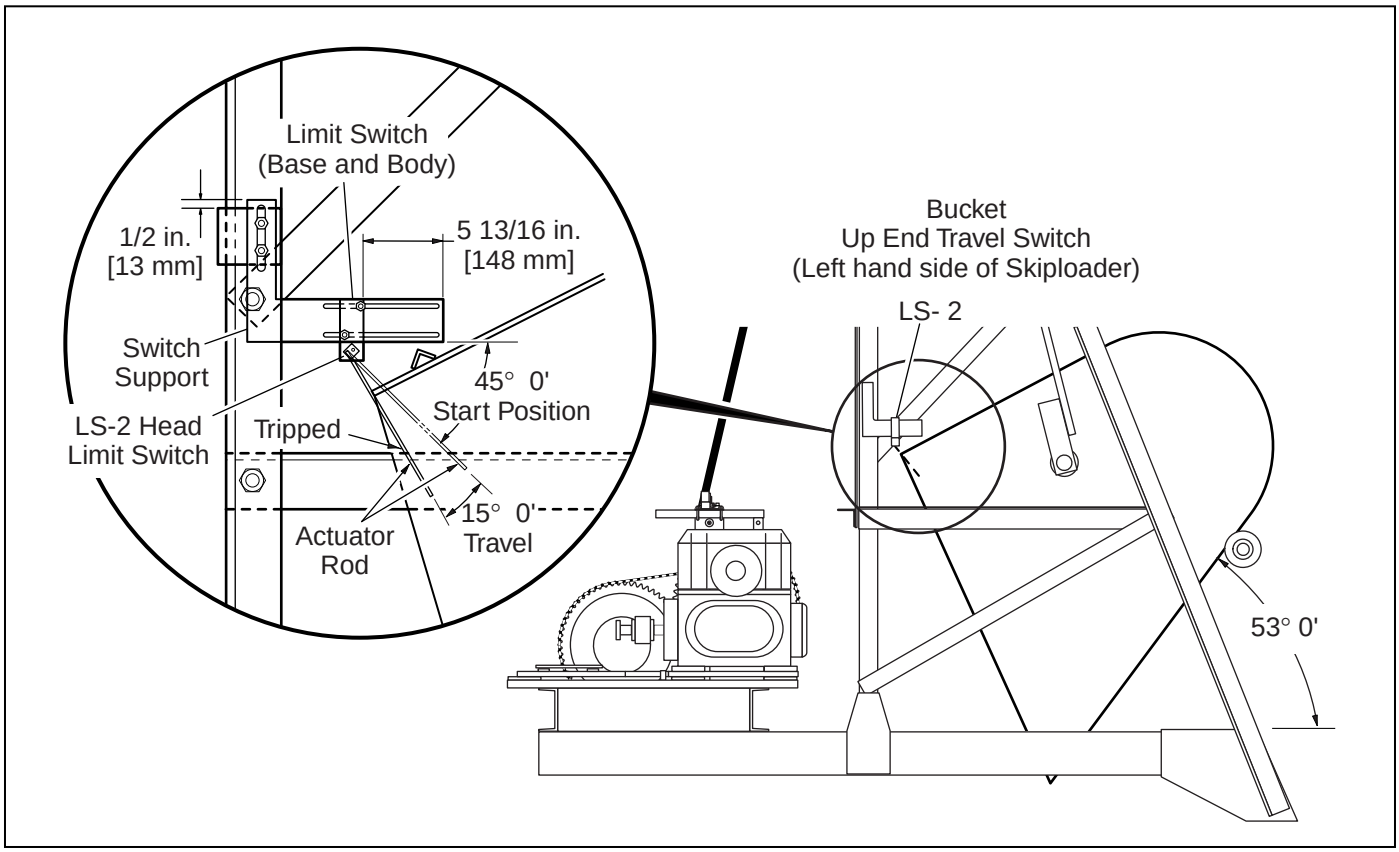


Figure 3.15 *Up End Travel Limit Switch – LS-2*

3.5 CABLE SWITCH AND ACTUATOR SWITCH ASSEMBLY/ADJUSTMENT

The cable switch (LS-5) is a safety switch that sets the down stop and up stop travel limits for the Skiploader bucket hoist cable. If the Skiploader hoist cable travels beyond these limits the cable switch de-energizes the Master Control Relay (MCR).

Refer to the following procedure, Figure 3.16 and Besser drawing 458053 to install and/or adjust the cable switch:

1. Locate and weld the square tube opposite of the drive shaft, and outside of the drum area on both shaft supports.
2. Assemble the cable switch with the switch located on the motor side as shown in the Besser drawing.
3. Adjust the trip cable assembly so the Skiploader hoist cable travel is between the trip cables.
4. Using the arm assembly eye bolts, tighten both cables equally until the switch releases.
5. Lock the eye bolts with nuts.

6. Install the two switch activation clamps provided. Follow the cable limits as shown in Figure 3.16.
   - With the bucket in the receiving (down) position, install the first (left) clamp, allowing no more than 1/32 inch [.79 mm] clearance between the cable and clamp.
   - With the bucket in the discharge (up) position, install the second (right) clamp in the same manner.

NOTE:
During normal operation, the clamps should lightly contact the Skiploader cable without unnecessarily tripping the cable switch.

7. Lower the bucket.
8. Shut off power and lock out.
9. Wire the switch into the Skiploader circuit.
10. Test cable switch operation – the Skiploader should stop if the trip cable moved by the Skiploader bucket hoist cable.

CAUTION:
Do not operate the Skiploader until you are sure that it has been installed and adjusted properly.

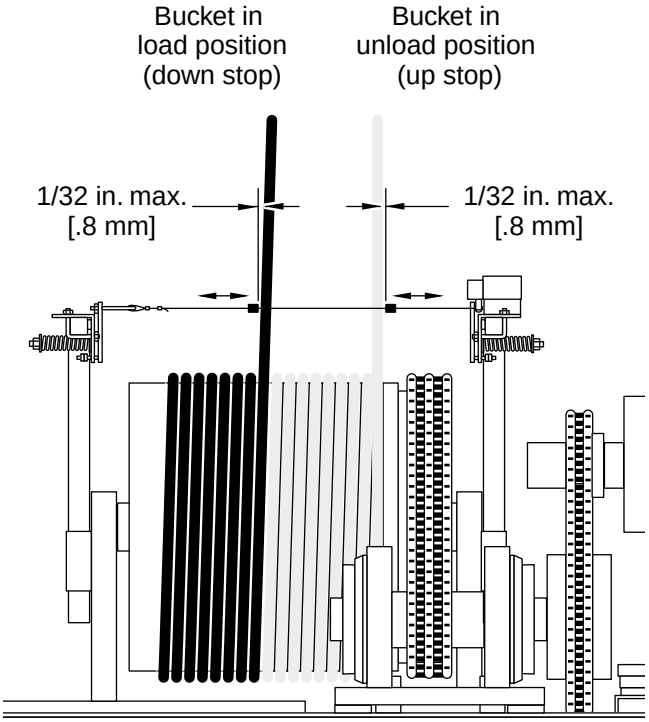


Figure 3.16 *Trip Cable Clamp Locations – Cable Switch*

3.6 LADDERS, WALKWAYS AND GUARDING

Figures 3.17 and 3.18 show the locations of ladders, walkways and guarding for a typical Skiploader installation.

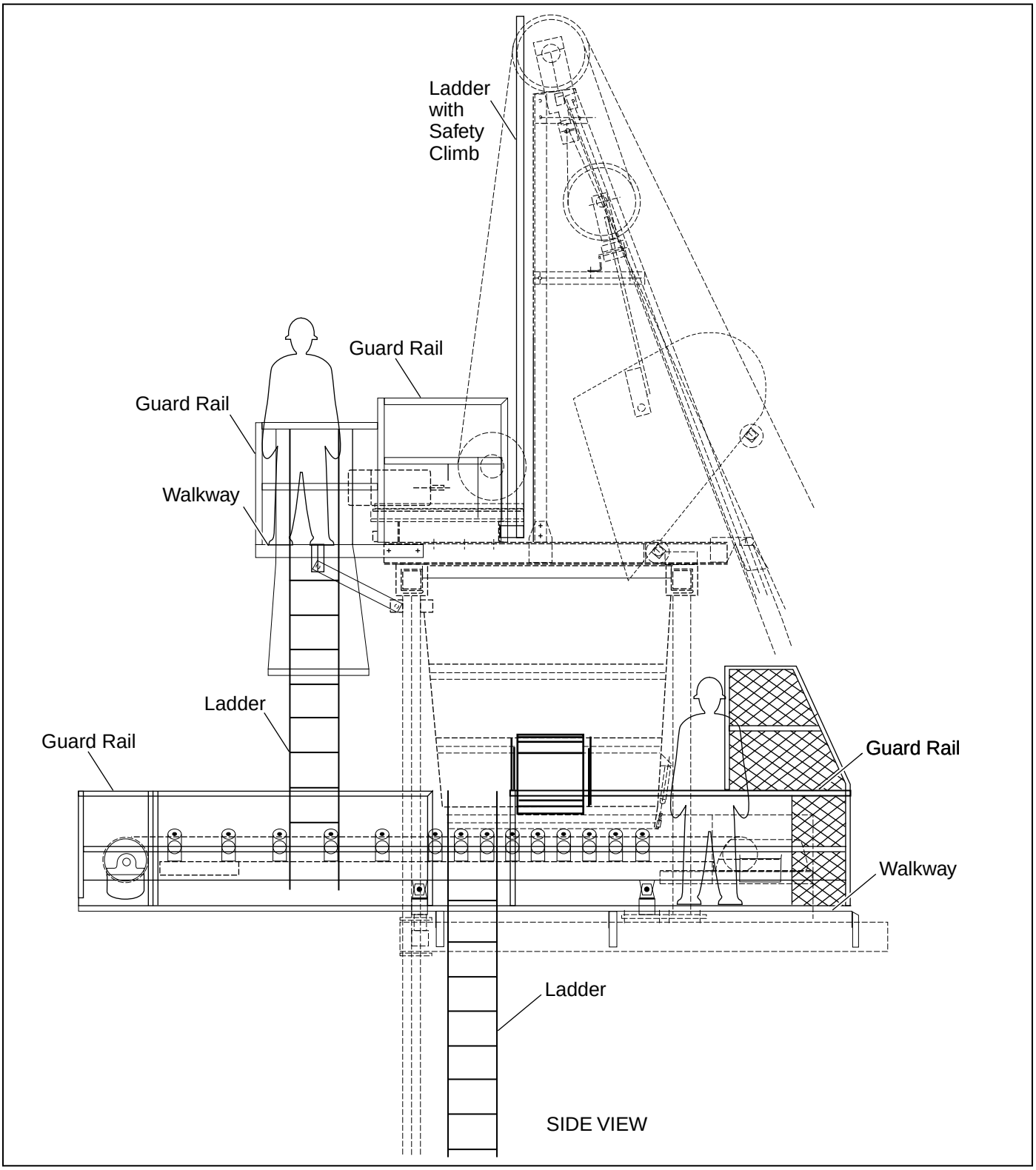


Figure 3.17 *Ladders, Guard Rails and Walkways – Side View*

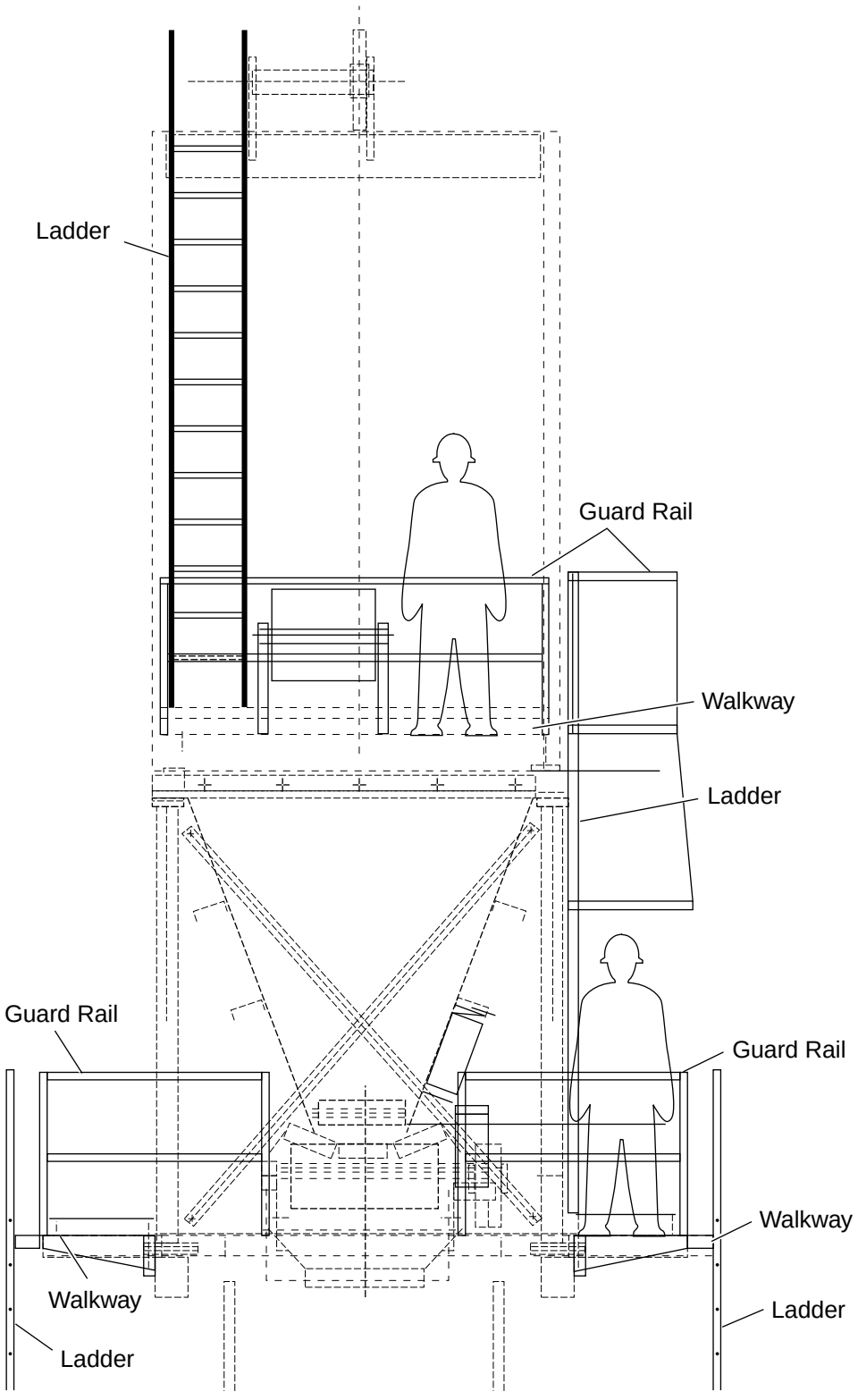


Figure 3.18 *Ladders, Guard Rails and Walkways – Front View*

The customer must purchase all ladders, walkways and guarding from a supplier and assumes all responsibility for meeting all safety code requirements. Refer to Besser print number 470983.

The actual locations and setup of this safety equipment is specific for each individual installation.

1. Install guards to protect personnel from drive pinch points and crush points.
2. Install a hinged door to safeguard access to the Skiploader drive and ladder to the top sheave. Interlock the hinged door with the control system so that the Skiploader shuts down upon opening the door.
3. Interlock the access door for the mixed material hopper (if provided) with the control system so that the Skiploader and metering belt shut down upon opening the door.
4. Install guard rails to protect personnel from falling into the pit. Install guard rails upon final installation of the Skiploader and adjacent machinery. Refer to Besser Print numbers 470983 and 470558.

3.7 FINAL ADJUSTMENTS

Before operating, lubricate and adjust the skiploader. Refer to the Maintenance/Operation Manual for details.