Martin®
Combination Cradle

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Operator's Manual
M3896

Important

MARTIN ENGINEERING HEREBY DISCLAIMS ANY LIABILITY FOR: DAMAGE DUE TO CONTAMINATION OF THE MATERIAL; USER'S FAILURE TO INSPECT, MAINTAIN AND TAKE REASONABLE CARE OF THE EQUIPMENT; INJURIES OR DAMAGE RESULTING FROM USE OR APPLICATION OF THIS PRODUCT CONTRARY TO INSTRUCTIONS AND SPECIFICATIONS CONTAINED HEREIN. MARTIN ENGINEERING'S LIABILITY SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF EQUIPMENT SHOWN TO BE DEFECTIVE.

Observe all safety rules given herein along with owner and Government standards and regulations. Know and understand lockout/tagout procedures as defined by American National Standards Institute (ANSI) ANSI/ASSP z244.1-2024, *The Control of Hazardous Energy Lockout, Tagout And Alternative Methods and Occupational Safety* and Health Administration (OSHA) Federal Register, Title 29 Subtitle B Chapter XVII Subpart J 1910.147, *Control of Hazardous Energy Source (Lockout/Tagout);* Final Rule.

The following symbols may be used in this manual:

⚠ DANGER

Danger: Immediate hazards that will result in severe personal injury or death.

⚠ WARNING

Warning: Hazards or unsafe practices that could result in personal injury.

⚠ CAUTION

Caution: Hazards or unsafe practices that could result in product or property damages.

IMPORTANT

Important: Instructions that must be followed to ensure proper installation/operation of equipment.

NOTE

Note: General statements to assist the reader.

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Introduction

General

The Martin® Combination Cradles are layered, shock-absorbing conveyor belt transfer point products engineered for use in bulk solids handling industries.

References

The following documents are referenced in this manual:

- American National Standards Institute ANSI/ASSP Z244.1-2024, *The Control of Hazardous Energy Lockout, Tagout and Alternative Methods* American National Standards Institute, Inc., 1180 6th Ave, 10th Floor New York, NY 10036.
- Federal Register, Title 29 Subtitle B Chapter XVII Subpart J 1910.147, *Control of Hazardous Energy Source (Lockout/Tagout); Final Rule*, Department of Labor, Occupational Safety and Health Administration (OSHA), 32nd Floor, Room 3244, 230 South Dearborn Street, Chciago, IL 60604.

Combination Cradle Materials

Materials and specifications for the Martin® Combination Cradles are shown in Table I.

Table I. Combination Cradle Materials and Specifications

Characteristics		Rubber Bar
MSHA-Accepted for Underground Use		NA
Coefficient of Friction		0.5
Service Temperature		-20 to 140°F (-29 to 60°C)
Bar Construction	Bearing Layer	UHMW Polyethylene
	Absorption Layer	60A Durometer Rubber
	T-Slot	Aluminum
	Fasteners	0.5-in. dia. T-Bolts

Safety

All safety rules defined in the above documents and all owner/employer safety rules must be strictly followed when working on this equipment.

Materials required

Only standard hand tools are required to assemble and service this equipment.

Before Installing Combination Cradle

IMPORTANT

The delivery service is responsible for damage occurring in transit. Martin Engineering CANNOT enter claims from damages. Contact your transportation agent for more information

1. Inspect shipping container for damage. Report damage to delivery service immediately and fill out delivery service's claim form. Keep any damaged goods subject to examination.
2. Remove combination cradle from shipping containers. Equipment in container should include the following:
   - Martin® Combination Cradle Assembly
   - Two Conveyor Products Warning Labels, P/N 23395
3. If anything is missing or damaged, contact Martin Engineering or a representative.
4. Make sure belt is centered on conveyor.

⚠WARNING

Before installing equipment, turn off and lock out/tag out energy source to conveyor and conveyor accessories.

5. Turn off and lock out/tag out energy source according to ANSI standards (see "References").

⚠WARNING

If equipment will be installed in an enclosed area, gas level or dust content must be tested before using a cutting torch or welding. Using a cutting torch or welding in an area with gas or dust may cause an explosion.

6. If using a cutting torch or welding, test atmosphere for gas level or dust content. Cover conveyor belt with fire retardant cover.
7. If not already present, install an impact idler 1 in. (25 mm) ahead of and 1 in. (25 mm) behind combination cradle location.
8. Remove any unnecessary idlers.

Installing Combination Cradle

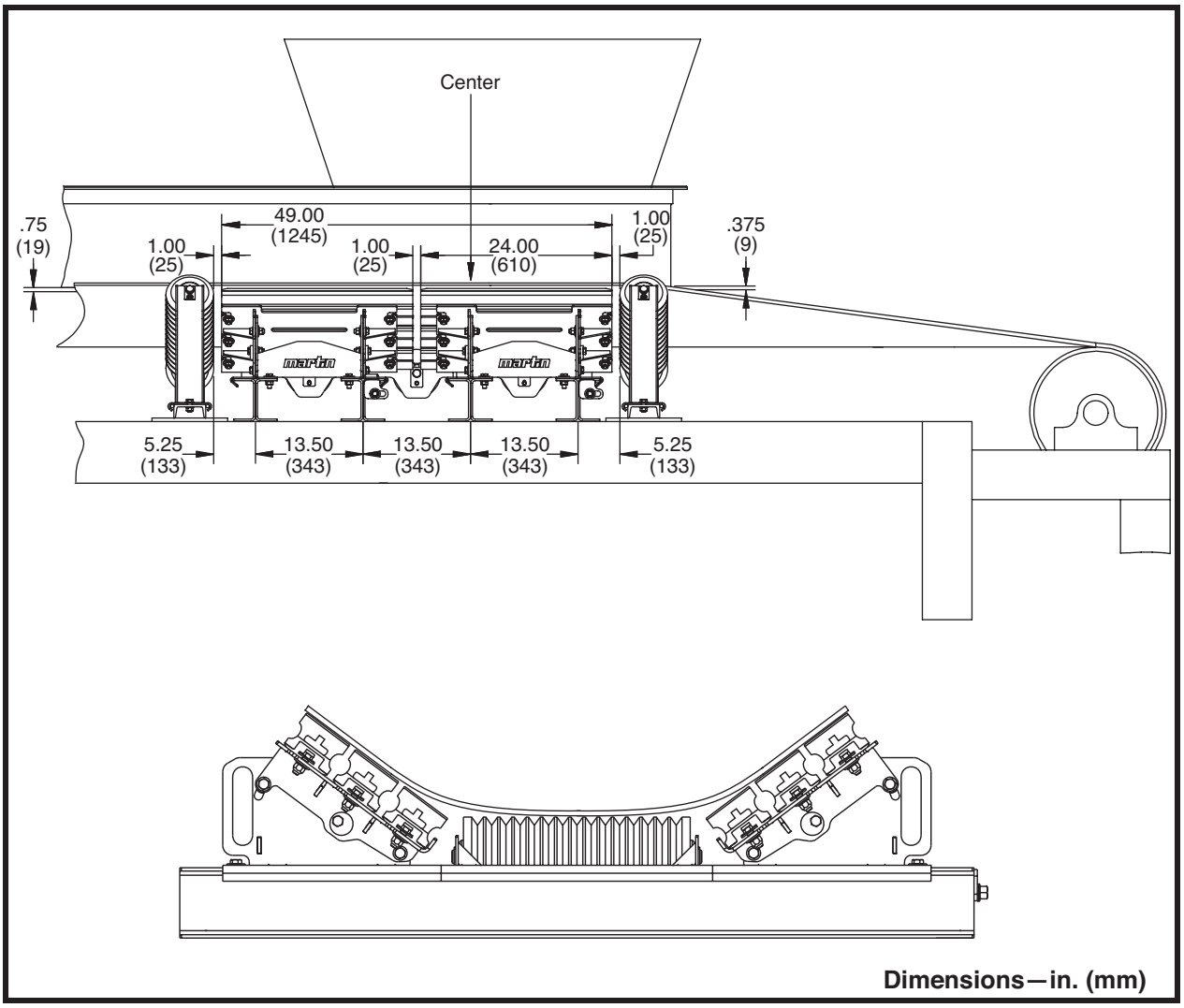


Figure 1. Measuring for Combination Cradle with Center Impact Roll

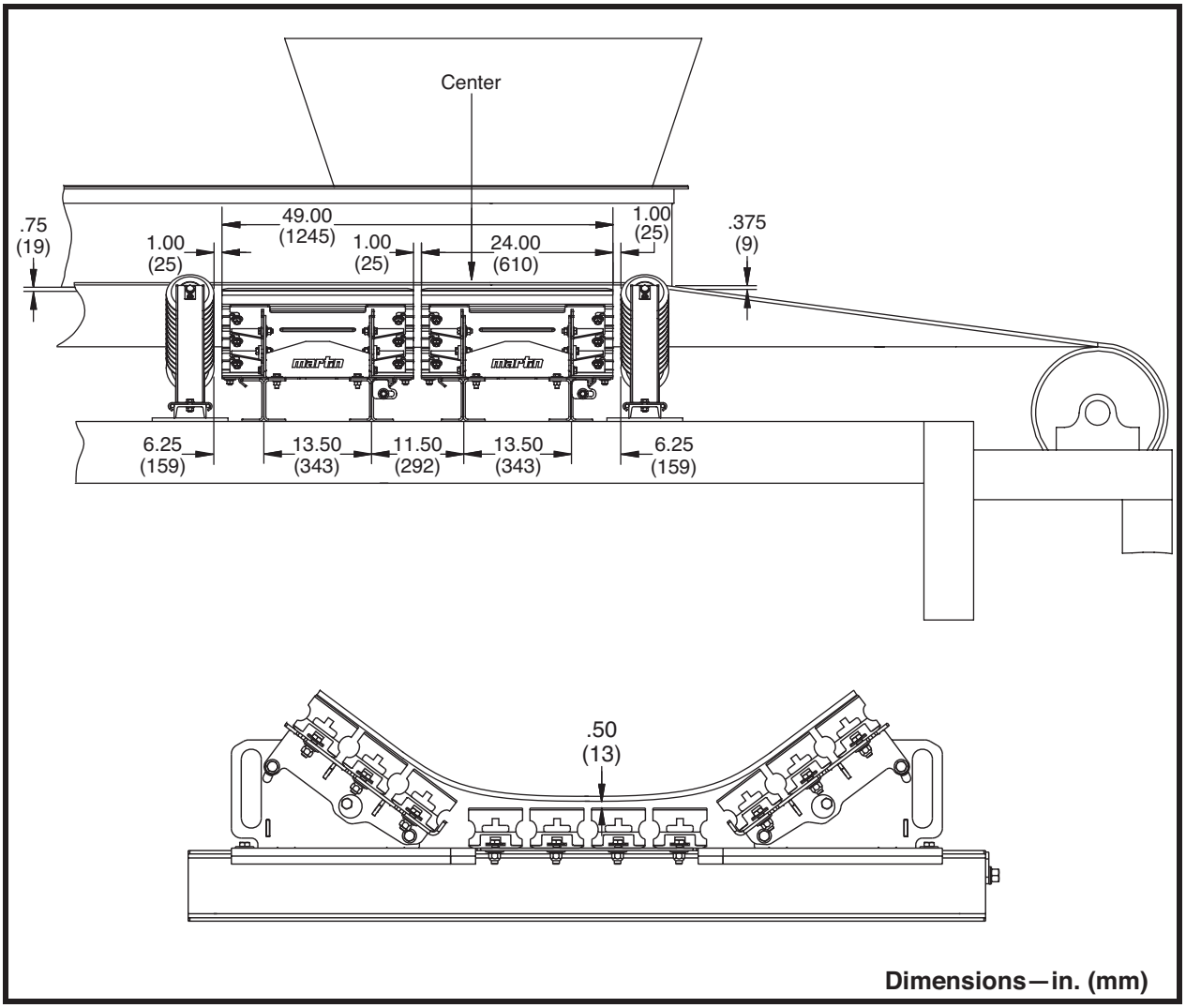


Figure 2. Measuring for Combination Cradle with Center Impact Bars

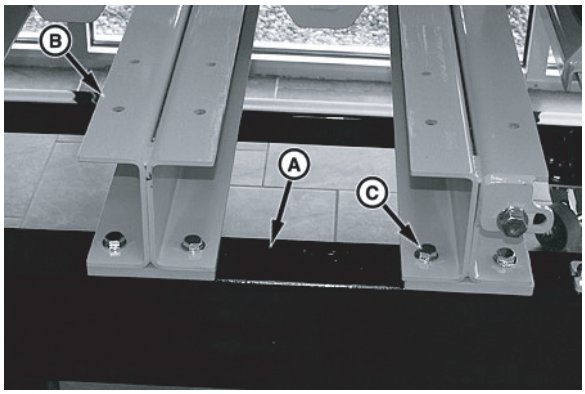
1. See Figure 1 or 2. The distance between top of belt and bottom of wear liners must increase over length of transfer point. If necessary, modify chute walls and/or wear liners.
2. Mark center of loading point on stringer; both sides of belt.

NOTE

A maximum of two combination cradles can be installed between idlers.

3. Install an idler 1 in. (25 mm) before and 1 in. (25 mm) after combination cradle(s).
4. When using impact roll in center of cradle make sure belt will contact roll.
5. When using impact bars in center of cradle make sure clearance between belt and bars will be 1/2 in. (13 mm).
6. Make sure clearance between belt and wing section is 1/2 in. (13 mm) where wing section meets center section and tapers to no clearance between belt and wing section at outside edge.

Installing on Standard Stringer



A. Stringer
B. Cross Support (2 used)
C. Cap Screw, Washers, and Nut (8 used)

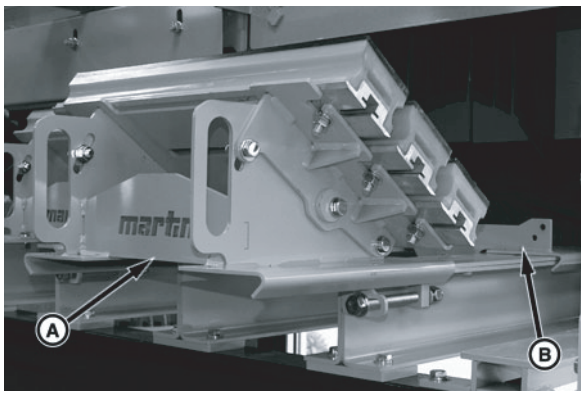
1. Mark location of cross supports (B) on stringers (A). See Figure 1 or 2 for mounting dimensions.
2. Position cross supports on stringers.
3. Make sure cross supports are perpendicular to belt and centered below belt, or bars will wear unevenly and maintenance will be difficult.
4. When using impact roll in center of cradle make sure belt will contact roll.
5. When using impact bars in center of cradle make sure clearance between belt and bars will be 1/2 in. (13 mm):
   a. For conveyors using CEMA D6 idlers install 1/2 in. shim plates included in cradle assembly hardware kit.
   b. For conveyors using CEMA E6 or E7 idlers order and install shim kit P/N UC-001710 from Martin Engineering.
   c. If clearance is greater than 1/2 in. after installing appropriate shims, order and install shim kit P/N UC-001710 from Martin Engineering.
   d. If clearance is less than 1/2 in. contact Martin Engineering or a representative.

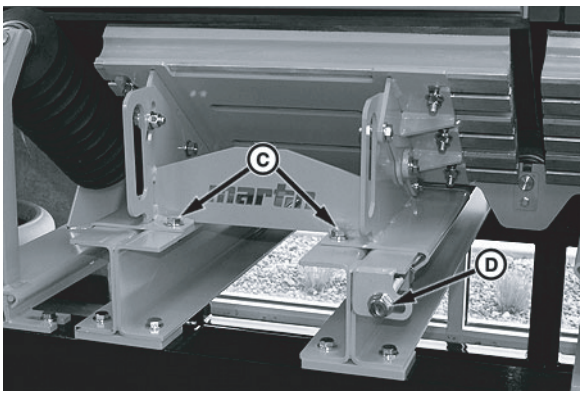
NOTE

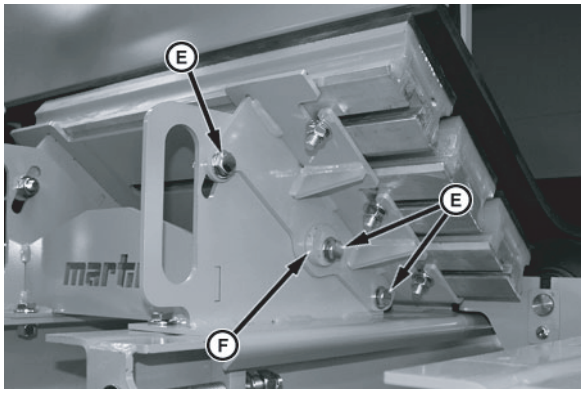
Martin Engineering recommends bolting rather than welding cross supports to stringers for easier accessibility and maintenance.

6. Bolt or weld cross supports to stringers as follows:
   a. If bolting, drill or cut 9/16-in. holes in stringers through mounting holes in feet of cross supports. Install cap screw, flat washer, compression washer, and nut (C) in each hole to secure cross supports to stringers.
   b. If welding, clean stringer of rust and dirt. Then stitch weld cross supports to stringers.

Installing Impact Bars







A. Wing Weldment (2 used)
B. Center Weldment
C. Cap Screw, Washer, and Nut (4 used)
D. Cap Screw
E. Cap Screw, Washer, and Nut
F. Eccentric

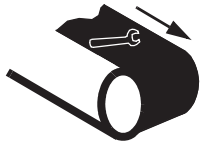
1. Slide center weldment (B) with bars/rolls onto cross supports. Position the weldment under the center of the belt.
2. Slide wing weldment (A) with bars onto cross supports until weldment contacts center weldment. Install second wing weldment on opposite side.
3. Center cradle under belt.
4. Insert cap screws, washers, and nuts (C) through wing weldments into cross supports.
5. Tighten cap screw (D) on lock mechanism to lock the weldments in place.
6. Loosen cap screws, washers, and nuts (E).
7. Rotate eccentric (F) to position impact bars against belt.
8. Tighten cap screws, washers, and nuts (E).
9. When using impact roll in center of cradle make sure belt is contacting roll.
10. When using impact bars in center of cradle make sure clearance between belt and bars is 1/2 in. (13 mm).
11. Make sure clearance between belt and wing section is 1/2 in. (13 mm) where wing section meets center section and tapers to no clearance between belt and wing section at outside edge.
12. Make sure there is 1 in. of clearance between bars and idler on both ends of cradle.

After Installing Combination Cradle

IMPORTANT

Read entire section before beginning work.

1. Thoroughly wipe outside chute walls clean above combination cradle on both sides of chute. Place a Conveyor Products Warning Label (P/N 23395) on each chute wall visible to belt operator.



⚠WARNING

Failure to remove tools from installation area and conveyor belt before turning on energy source can cause serious injury to personnel and damage to belt.

2. Remove all tools and fire retardant cover from installation area and conveyor belt.

⚠ DANGER

Do not touch or go near conveyor belt or conveyor accessories when conveyor belt is running. Body or clothing can get caught and pull body into conveyor belt, causing severe injury or death.

3. Turn on conveyor belt.

⚠WARNING

Before adjusting combination cradle, turn off and lock out/ tag out energy source to conveyor belt and conveyor accessories.

4. After 1 hour of operation, turn off and lock out/tag out energy source according to ANSI standards (see “References”).
5. Make sure all fasteners are tight. Tighten if necessary.
6. Inspect impact bars for wear. (A small amount of “break-in” wear may be found. This will stop once the bars wear to conveyor belt contour.)
7. If excessive wear, uneven wear, or some other problem exists, see “Troubleshooting/ Installation Checklist.”

Maintenance

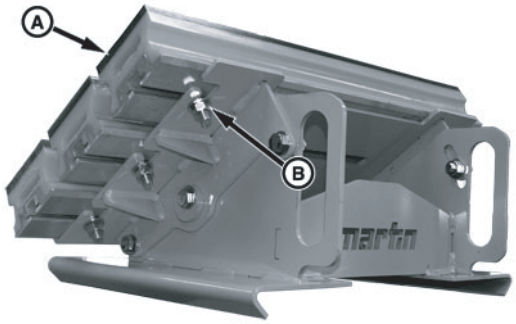
IMPORTANT

Read entire section before beginning work.

⚠WARNING

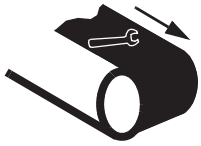
Before servicing combination cradle, turn off and lock out/tag out energy source to conveyor belt and conveyor accessories.

1. Turn off and lock out/tag out energy source according to ANSI standards (see “References”).
2. Make sure all fasteners are tight. Tighten if necessary.



A. Impact Bar
B. Cap Screw, Washer, and Nut

3. Check bars for wear. If top cover on bars is worn through to orange rubber, replace bars as follows:
   a. Loosen cap screw on lock mechanism.
   b. Remove cap screws, washers, and nuts holding wing weldment to cross support.
   c. Remove wing weldments and center weldment.
   d. Replace impact bars (A) on each weldment as follows:
      (1) Loosen cap screws, washers, and nuts (B).
      (2) Slide bar so cap screws will fit through slots and bar can be removed.
      (3) Replace worn bars and reinstall in reverse order.
4. Remove fines between impact bars with broom or high-pressure air or water.
5. Inspect combination cradle for cracks or fatigue. Weld or strengthen structure as necessary.
6. Wipe warning labels clean. If labels are not readable, contact Martin Engineering or a representative for replacements.



⚠WARNING

Failure to remove tools from maintenance area and conveyor belt before turning on energy source can cause serious injury to personnel and damage to belt.

7. Remove all tools from maintenance area.

⚠DANGER

Do not touch or go near conveyor belt or conveyor accessories when conveyor belt is running. Body or clothing can get caught and pull body into conveyor belt, causing severe injury or death.

8. Start conveyor belt.

Troubleshooting/Installation Checklist

Troubleshooting If you are experiencing problems with Martin® Combination Cradle, see below:

Symptom	Corrective Action
High impact bar wear rate.	Combination cradle is installed too close to belt. Make sure combination cradle center impact bars are 1/2 in. (13 mm) below belt.
Impact bars worn unevenly.	Belt is unevenly loaded, wear liners are improperly installed, and/or impact bars are not parallel to belt travel. Inspect loading area and wear liners, and modify transfer point if necessary.

Installation checklist If after taking corrective actions suggested under "Troubleshooting" you are still experiencing problems, check for the following:

Installation Checklist
Chute walls and/or wear liners are 3/8 in. above belt at tail and 3/4 in. above belt at head.
Combination cradle aligns with center of loading point.
An idler is installed 1 in. (25 mm) before and 1 in. (25 mm) after combination cradle.
Center impact bars/rolls are centered below belt and are parallel to belt travel.
Wing sections are aligned with idlers.
When using impact roll in center of cradle make sure belt is contacting roll.
When using impact bars in center of cradle make sure clearance between top of center impact bars and bottom of belt surface is 1/2 in. (13 mm).

Part Numbers

This section provides product names and corresponding part numbers for Martin® Combination Cradles. Please reference part numbers when ordering parts.

Martin® Combination Cradle

Martin® Combination Cradle,
P/N UCGBB-XXXXXMUPAS

Martin® Combination Cradle with Center Rolls,
P/N UCGBR-XXXXXMUPAS

Miscellaneous

Shim Kit: P/N UC-001710.

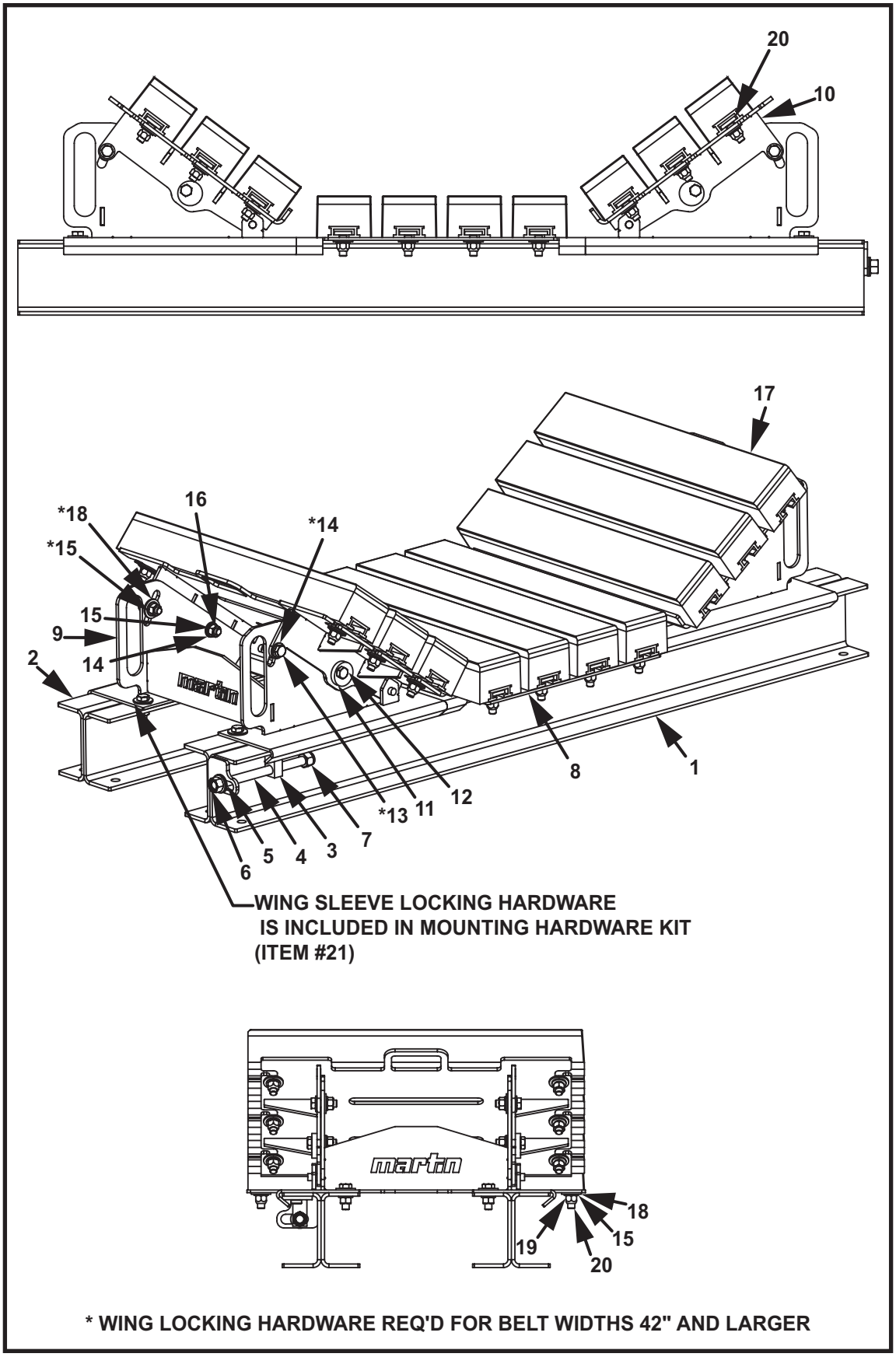


Figure 3. Martin® Combination Cradle, P/N UCGBB-XXXXXMUPAS (Sheet 1 of 2)

Item	Description	Part Number	Qty
1	Cross Support Weldment (Locking)	UC-001600L-XXX*	1
2	Cross Support Weldment	UC-001600-XXX*	1
3	Locking Weldment	UC-001640-XX**	1
4	Draw Bolt 5/8-11NC SS	Table II	1
5	Washer Flat 5/8 Narrow ZP	16814	1
6	Washer Compression 5/8	11752	1
7	Nut Hex Elastic Lock 5/8-11NC ZP	22624	1
8	Center Sleeve	UC-001611-XX**	1
9	Wing Weldment	UC-001620-XXXX***	2
10	Wing Plate WLD	UC-001650-XXXX***	2
11	Eccentric	Table III	4
12	Screw HHC 1/2-13NC x 1-3/4 ZP	36228	4
13	Screw HHC 1/2–13NC x 1-1/2 ZP	11763	Table III
14	Washer Flat 1/2 Narrow ZP	31010	Table III
15	Washer Compression 1/2	11750	Table III
16	Nut Hex 1/2-13NC ZP	11771	8
17	Rubber Impact Bar	31617-24	Table III
18	Washer Flat 1/2 Wide ZP	17328	Table III
19	Nut Hex Lock 1/2-13NC All Metal	36215	Table III
20	T-Bolt 1/2-13NC x 1-1/2	31775	Table III
(NS) 21	Mounting Kit	UC-001690	1
(NS) 22	Label Kit	34042	1
(NS) 23	Operator’s Manual	M3896	1

NS = Not Shown

Figure 3. Martin® Combination Cradle, P/N UCGBB-XXXXXMUPAS (Sheet 2 of 2)

First XX indicates belt width. Third X indicates Standard (S) or Wide (W) base stringer. Next XX indicates trough angle 20, 35, or 45 degrees.
The M indicates Medium CEMA Duty Rating. The U indicates Urethane Impact Bar. The P indicates Painted Steel.
The A indicates Shipping Assembled. The S indicates Standard Stringer.

*First XX indicates belt width. Third X indicates Standard (S) or Wide (W) base stringer.

**XX indicates belt width.

***First XX indicates belt width. Next XX indicates trough angle.

Table II. Martin® Combination Cradle Draw Bolt Part Numbers**

Part Number	P/N Item 4
UCGBB-XXSXXMUPAX	UC-001504
UCGBB-XXWXXMUPAX	UC-001504W

****First "XX" indicates belt width. Next "XX" indicates trough angle 20, 35, or 45 degrees. Last "X" indicates stringer type, where (S) indicates standard.

Table III. Martin® Combination Cradle Part Numbers and Quantities*

Part Number	P/N Item 11	Qty Item 13	Qty Item 14	Qty Item 15	Qty Item 17	Qty Items 18, 19 & 20
UCGBB-24XXXMUPAS	35994	0	4	16	6	12
UCGBB-30XXXMUPAS	35994	0	4	18	7	14
UCGBB-36XXXMUPAS	35994	0	4	18	7	14
UCGBB-42XXXMUPAS	35994	4	8	26	9	18
UCGBB-48XXXMUPAS	35994	4	8	28	10	20
UCGBB-54XXXMUPAS	35994-L	4	8	32	12	24
UCGBB-60XXXMUPAS	35994-L	4	8	34	13	26
UCGBB-72XXXMUPAS	35994-L	4	8	40	16	32

*First "X" indicates Standard (S) or Wide (W) base stringer. Next "XX" indicates trough angle.

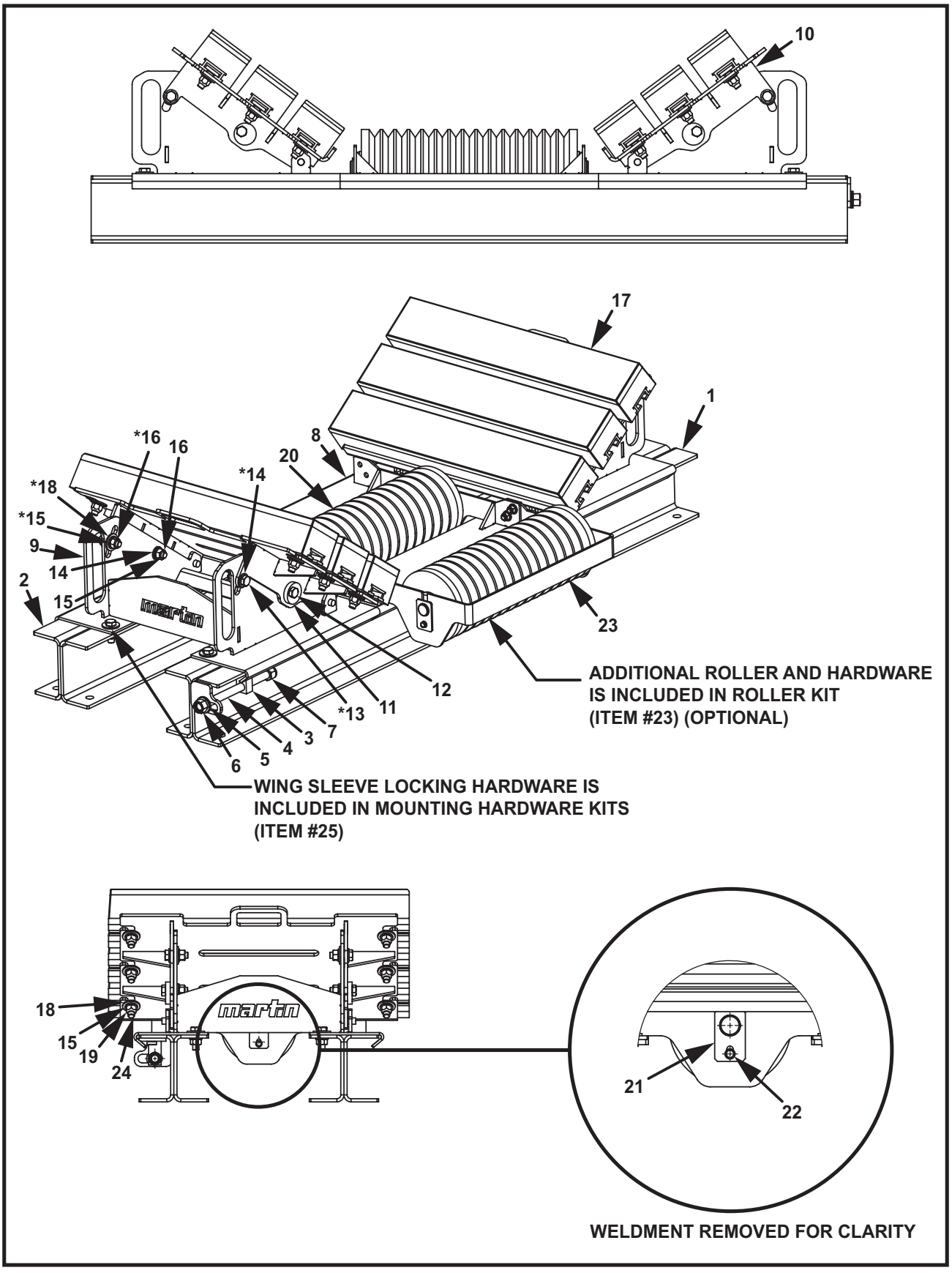


Figure 4. Martin® Combination Cradle with Center Rolls, P/N UCGBR-XXXXXMUPAS (Sheet 1 of 2)

Item	Description	Part Number	Qty
1	Cross Support Weldment (Locking)	UC-001600L-XXX*	1
2	Cross Support Weldment	UC-001600-XXX*	1
3	Locking Weldment	UC-001640-XX**	1
4	Draw Bolt 5/8-11NC SS	Table IV	1
5	Washer Flat 5/8 Narrow ZP	16814	1
6	Washer Compression 5/8	11752	1
7	Nut Hex Elastic Lock 5/8-11NC ZP	22624	1
8	Center Roll Weldment	UC-001660-XX**	1
9	Wing Weldment	UC-001620-XXXX***	2
10	Wing Plate Weldment	UC-001650-XXXX***	2
11	Eccentric	Table V	2
12	Screw HHC 1/2-13NC x 1-3/4 ZP	36228	2
13	Screw HHC 1/2–13NC x 1-1/2 ZP	11763	Table V
14	Washer Flat 1/2 Narrow ZP	31010	Table V
15	Washer Compression 1/2	11750	Table V
16	Nut Hex 1/2-13NC ZP	11771	Table V
17	Rubber Impact Bar	31617-24	Table V
18	Washer Flat 1/2 Wide ZP	17328	Table V
19	Nut Hex Top Lock 1/2-13NC GR 8 PP	36215	Table V
20	Roll Impact	TMIRD-XXIP**	1
21	Tie Tab	UC-002001	2
22	Screw Tapping HWH 1/4-20NC x 3/8 ZP	38608	2
23	Roller Cradle Roller Kit	UC-001670-XX**	1
24	T-Bolt 1/2-13NC x 1-1/2	31775	Table V
(NS) 25	Mounting Kit	UC-001690	1
(NS) 26	Label Kit	34042	1
(NS) 27	Operator’s Manual	M3896	1

NS = Not Shown

Figure 4. Martin® Combination Cradle with Center Rolls, P/N UCGBR-XXXXXMUPAS (Sheet 2 of 2)

First XX indicates belt width. Third X indicates Standard (S) or Wide (W) base stringer. Next XX indicates trough angle 20, 35, or 45 degrees. The M indicates Medium CEMA Duty Rating. The U indicates Urethane Impact Bar. The P indicates Painted Steel. The A indicates Shipping Assembled. The S indicates Standard Stringer.

*First XX indicates belt width. Third X indicates Standard (S) or Wide (W) base stringer.

**XX indicates belt width.

***First XX indicates belt width. Next XX indicates trough angle.

Table IV. Martin® Combination Cradle with Center Rolls Draw Bolt Part Numbers**

Part Number	P/N Item 4
UCGBR-XXSXXMUPAX	UC-001504
UCGBR-XXWXXMUPAX	UC-001504W

****First "XX" indicates belt width. Next "XX" indicates trough angle 20, 35, or 45 degrees. Last "X" indicates stringer type, where (S) indicates standard.

Table V. Martin® Combination Cradle with Center Rolls Part Number and Quantities*

Part Number	P/N Item 11	Qty Item 13	Qty Item 14 & 16	Qty Item 15	Qty Item 17	Qty Items 18, 19 & 24
UCGBR-24XXXMUPAS	35994	0	4	12	4	8
UCGBR-30XXXMUPAS	35994	0	4	12	4	8
UCGBR-36XXXMUPAS	35994	0	4	12	4	8
UCGBR-42XXXMUPAS	35994	4	8	20	6	12
UCGBR-48XXXMUPAS	35994	4	8	20	6	12
UCGBR-54XXXMUPAS	35994-L	4	8	24	8	16
UCGBR-60XXXMUPAS	35994-L	4	8	24	8	16
UCGBR-72XXXMUPAS	35994-L	4	8	28	10	20

*First "X" indicates Standard (S) or Wide (W) base stringer. Next "XX" indicates trough angle.

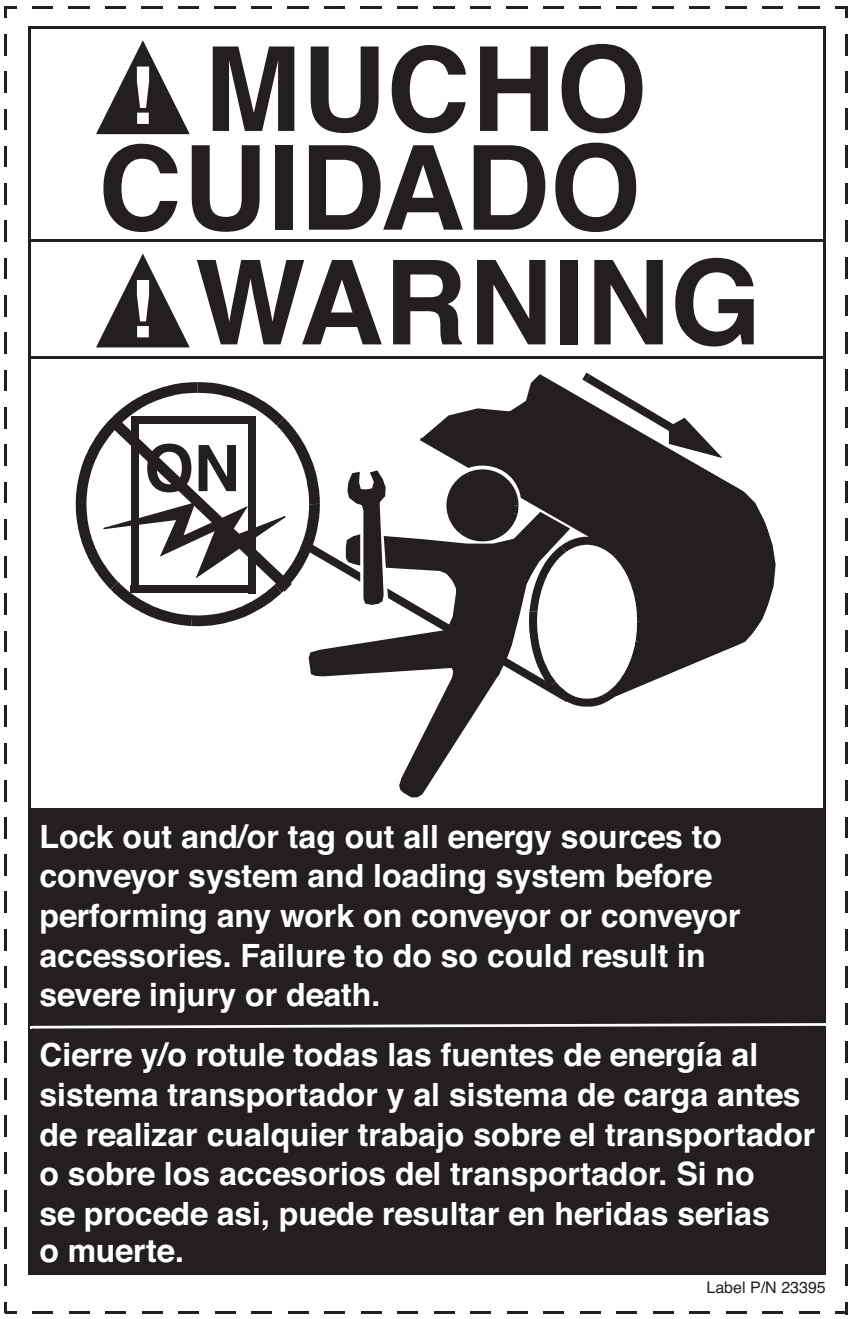


Figure 5. Conveyor Products Warning Label, P/N 23395

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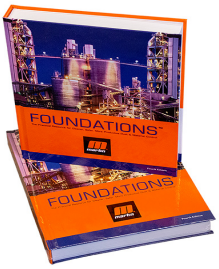

For nearly 30 years, Martin Engineering's Foundations™ Books have taught industry personnel to operate and maintain clean and safe belt conveyors. The Foundations™ Book, fourth edition, focuses on improving belt conveyors by controlling fugitive material. "The Practical Resource for Total Dust and Material Control," is a 576-page hard cover volume that provides information of value to industries where the efficient handling of bulk materials is a key to productivity and profitability.

Expanding upon the book, our Foundations™ Training Program addresses the design and development of more productive belt conveyors, and is offered in three customizable seminars. Attendees gain a better understanding of conveyor safety and performance, helping to justify upgrade investments and increase profitability.

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