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Assembly Manual

36D 18X8 BUCKET ELEVATOR

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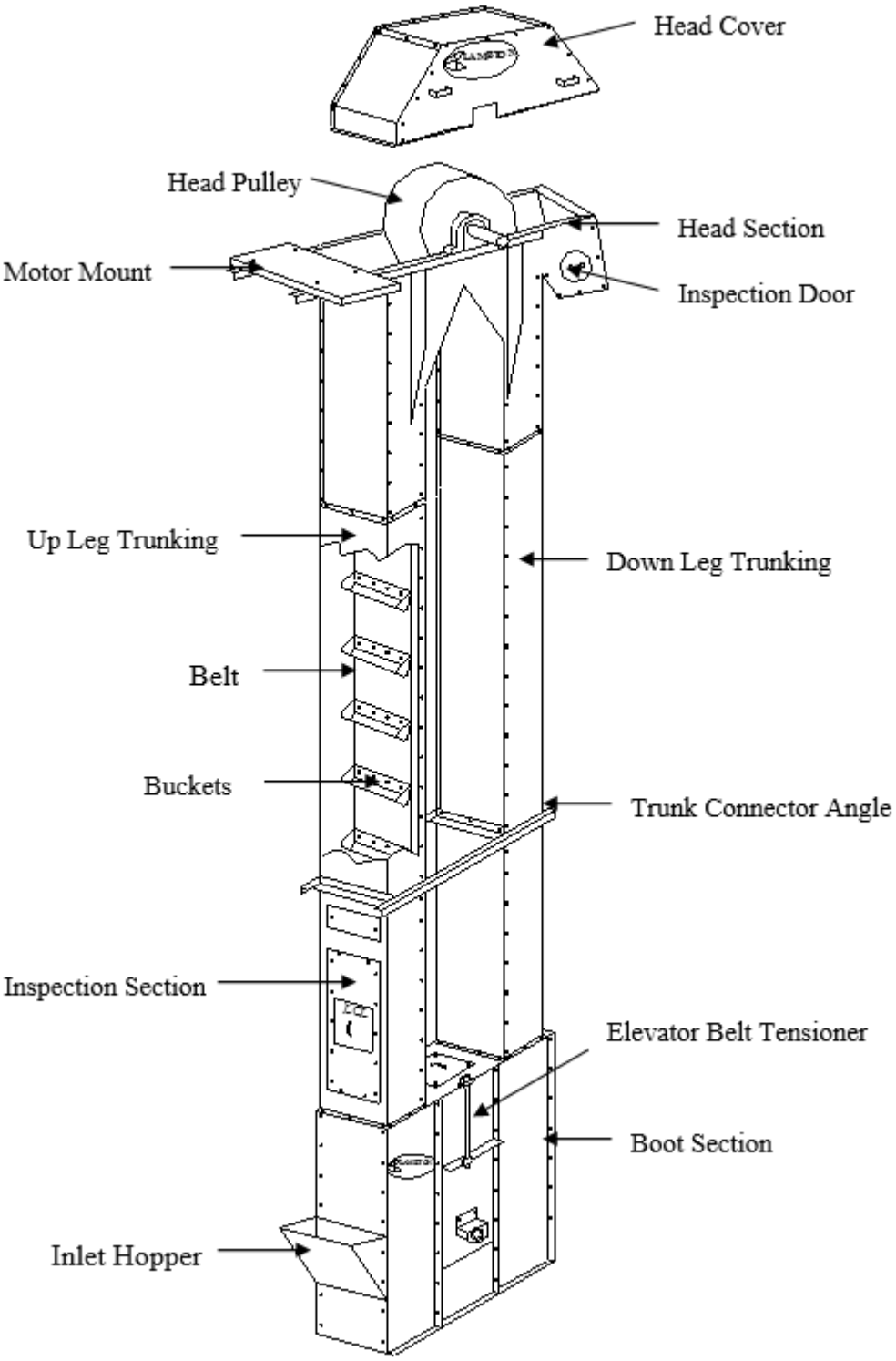
This manual contains information that is important for the owner/operators to know and understand. The information pertains to safety precautions and preventative maintenance procedures when operating and maintaining this equipment. It is the owner/operators responsibility to ensure that the operators and personnel working close to this equipment are aware of these safety guidelines. Failure to read and understand this manual is a misuse of the equipment and could result in serious injury or death.

This manual covers general information on the installation and maintenance of a Lambton Conveyor grain elevator. It also covers the many safety precautions that should be followed by all operators and personnel working around the equipment.

Due to the various situations we cannot cover all aspects of installing the elevator. We have provided a method for installation to be used as a guideline only, qualified contractors should be relied on to construct the elevator. Some conditions and surroundings alter the practices and steps that should be taken during assembly. For these reasons we cannot be responsible for the installation of the elevator. All personnel operating, installing, or maintaining the elevator should thoroughly read and understand this manual before working with the equipment.

It is Lambton Conveyors concern that all personnel associated with our grain handling equipment are kept safe. It is the buyer's responsibility to ensure that this manual is accessible to all personnel working with the bucket elevator. Safety labels have been installed at the manufacturing plant and should never be removed, altered, or covered in any way. Guards have been provided and should be in place at all times unless the elevator has been locked out. Failure to follow these guidelines could produce an extremely dangerous situation and may cause serious injury or death.

The following decal is found on various sections of the elevator, it is located where caution needs to be taken to avoid serious injury or death.


Head Cover
Head Pulley
Head Section
Motor Mount
Inspection Door
Up Leg Trunking
Down Leg Trunking
Belt
Buckets
Trunk Connector Angle
Inspection Section
Elevator Belt Tensioner
Boot Section
Inlet Hopper

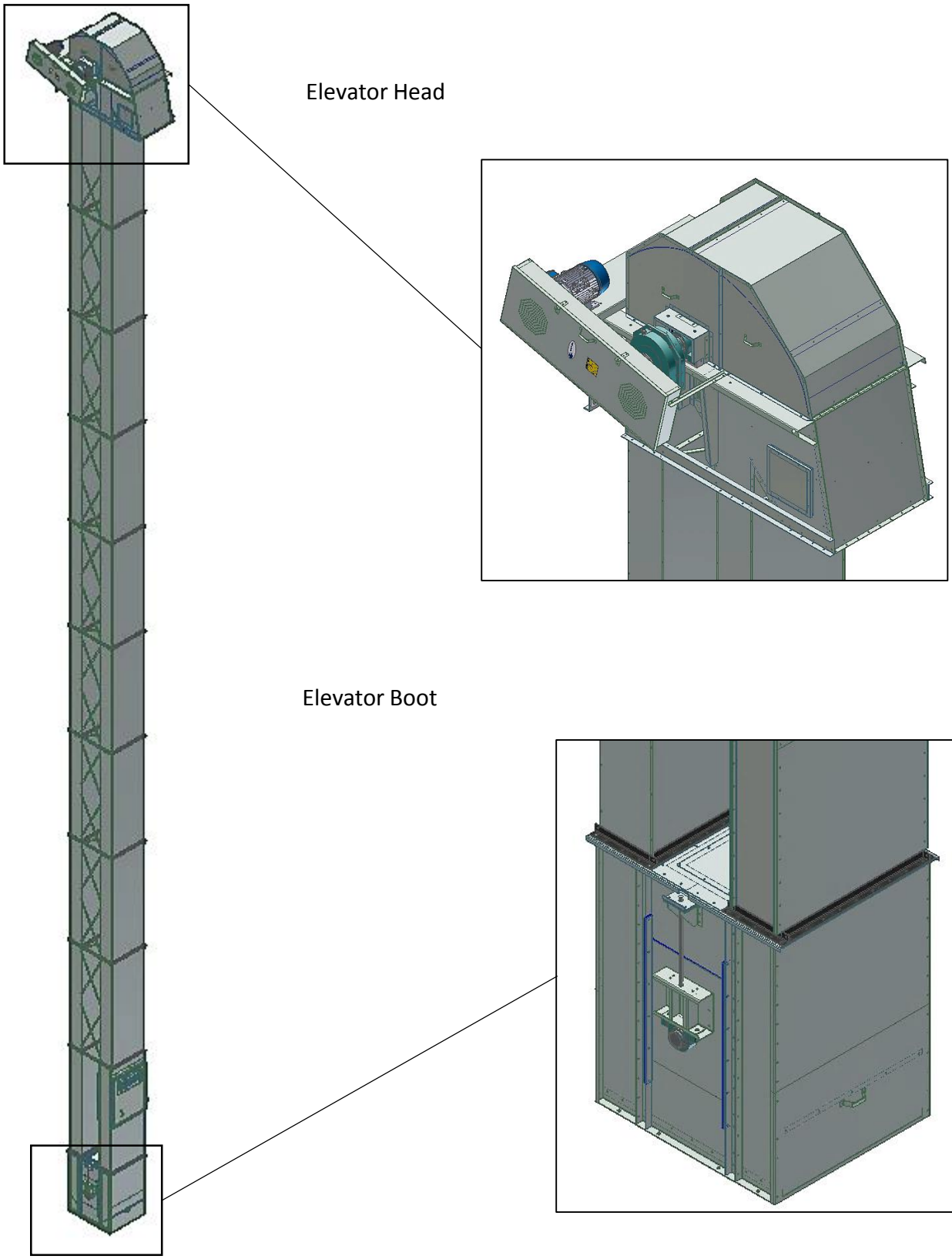
Inspection Upon Delivery

Carefully inspect your shipment as soon as it is received. Verify that the quantity of parts or packages corresponds with the packing slip. Any discrepancies should be taken care of immediately. Report any damages or shortage of parts to the delivering carrier as soon as possible. Lambton Conveyor's responsibility to damaged equipment ends with your acceptance to delivery. Save all paperwork and documentation with any of the elevator components.

Pre-Installation Preparation

Lambton Conveyors bucket elevators are designed to be vertically self-supporting when erected but are required in all situations to be supported or guyed for additional loads such as wind, distributors, cleaners, spouting, etc. Separate structures or adequate support must be provided for any accessory equipment.

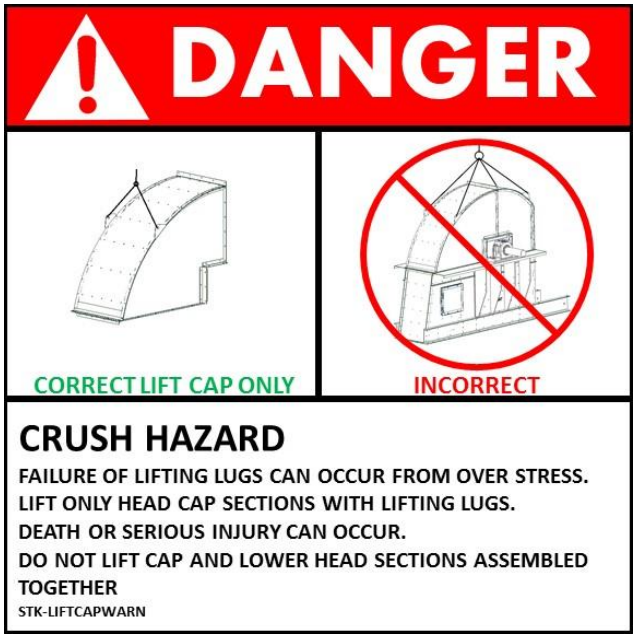
Lambton Conveyor does not assume responsibility for installation by any other vendor other than ours. The installation recommendations within this manual are for consideration only. The owner should consult a qualified civil or structural engineer regarding the design, construction and supervision of the installation, including the foundation and bracing systems. The most important part of the installation is retaining qualified personnel to plan, and erect the elevator as well as its accompanying equipment.



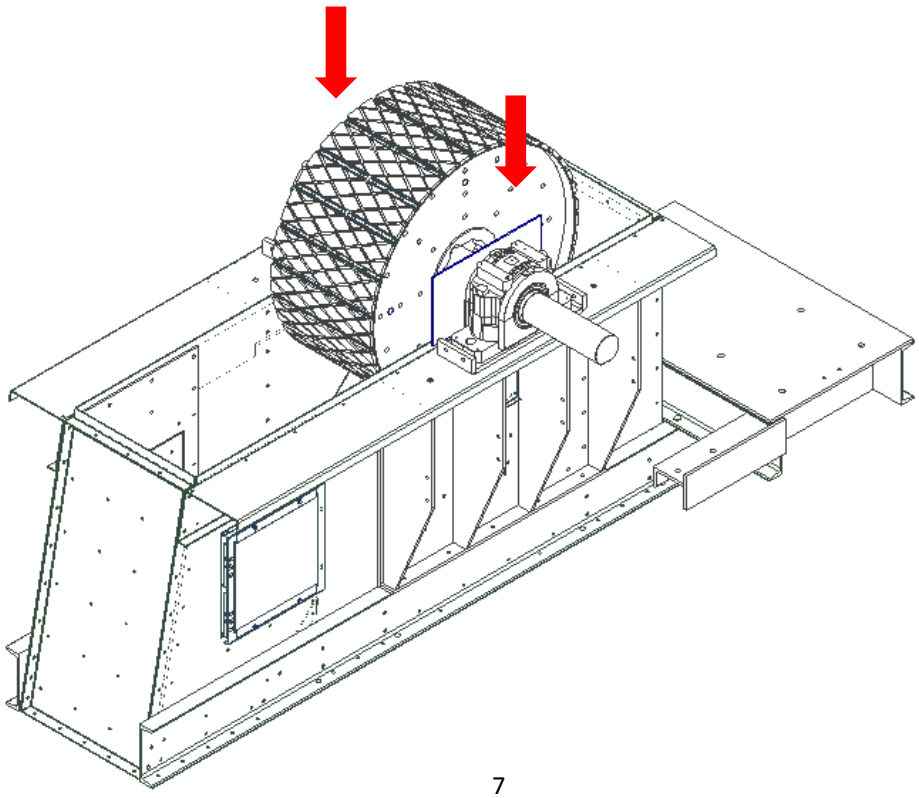
Elevator Head

Elevator Boot

Use Care when lifting the elevator head, do not lift the entire elevator head by the lugs provided on the cap sections, these lugs are provided for lifting the cap section only

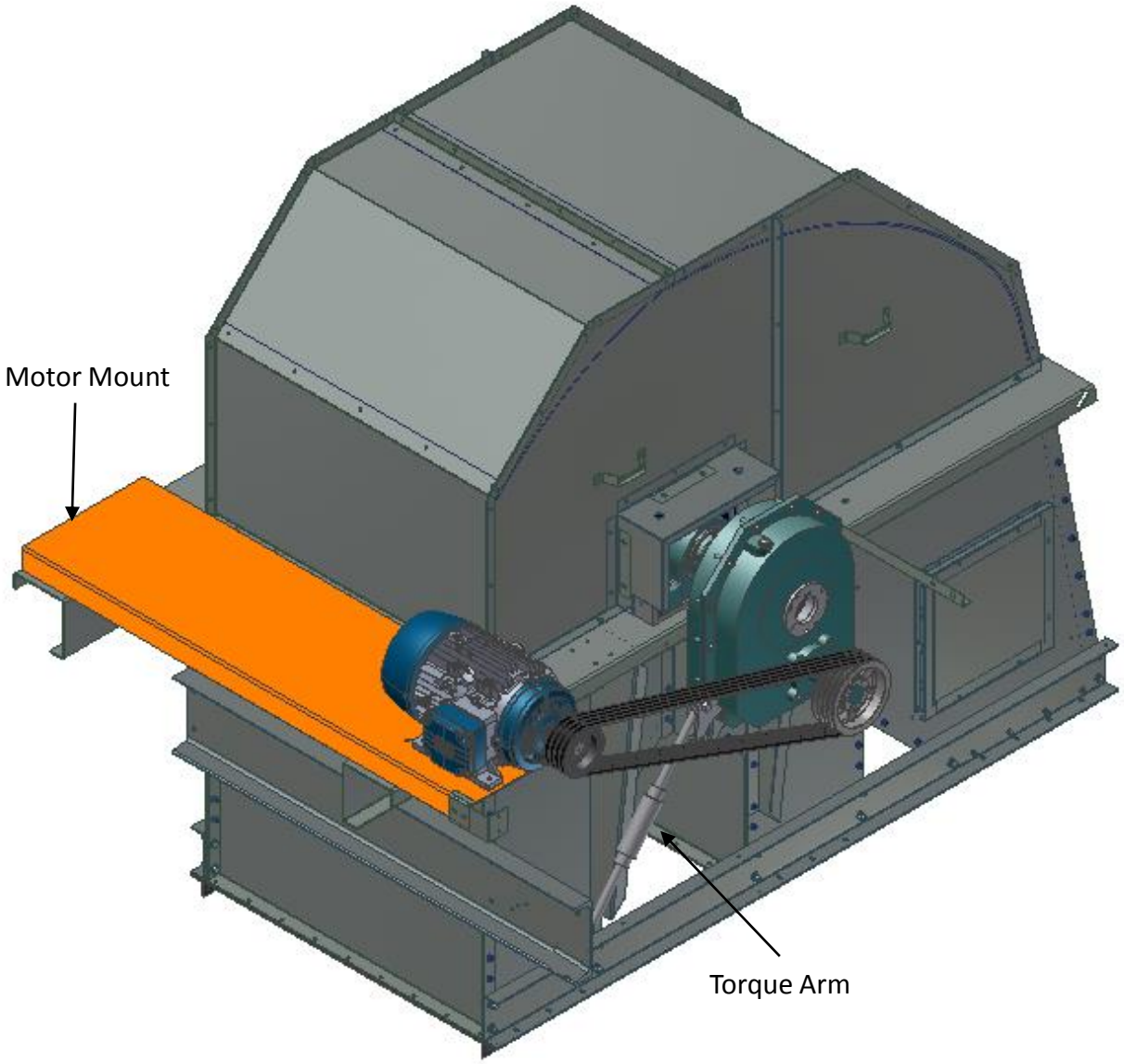


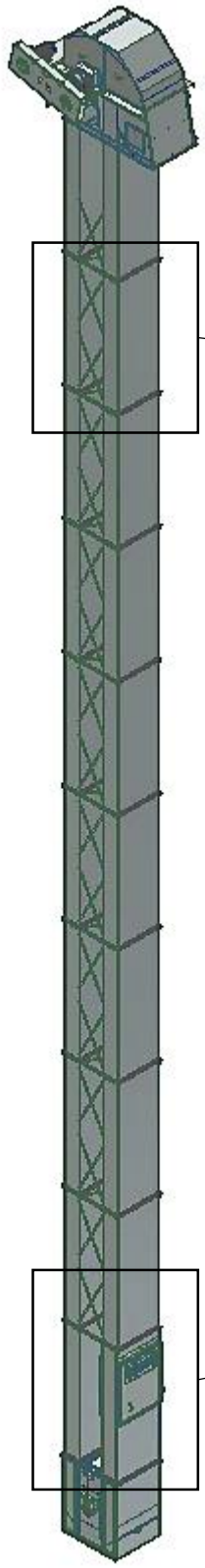
Use rigging and slinging around the pulley shaft to lift the head assembly.



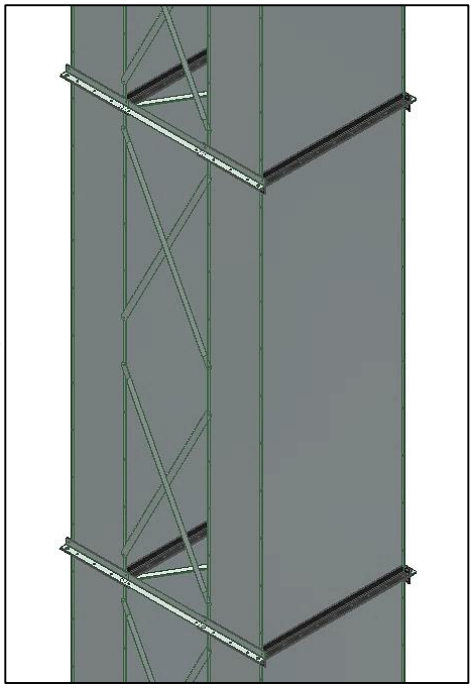
Motor Mount

Motor mount will mount opposite the discharge on top of the head frame channel.

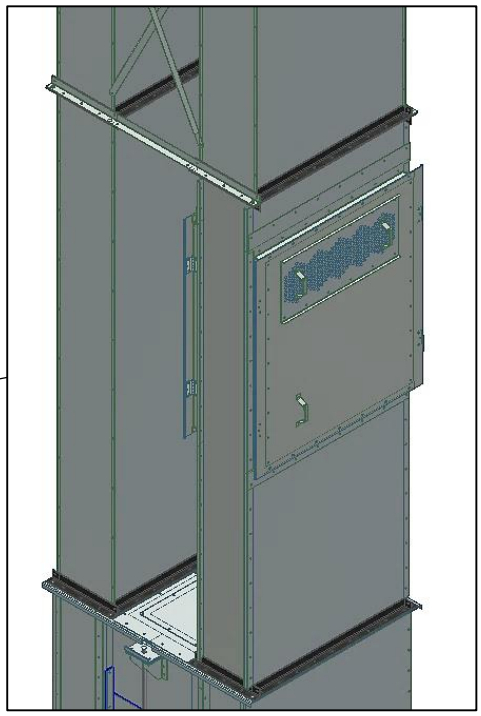




Standard Trunk Sections

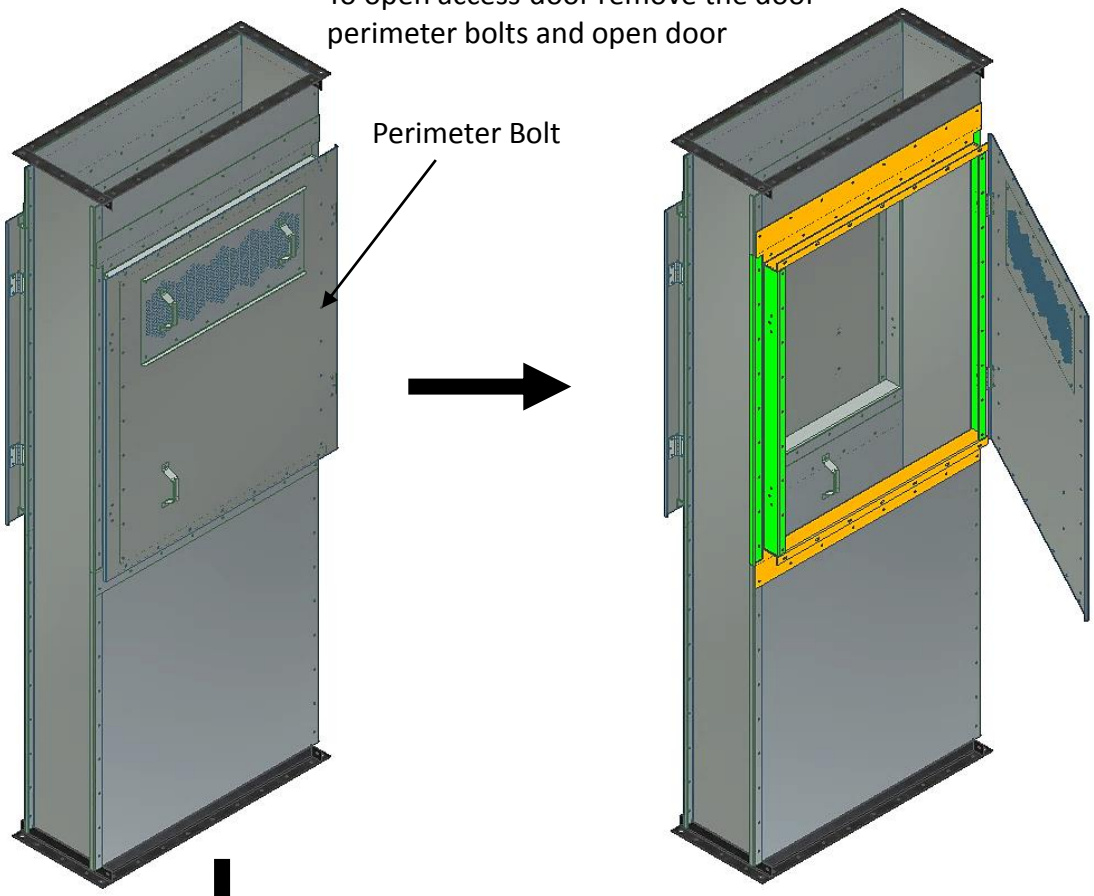


Inspection Trunk Sections

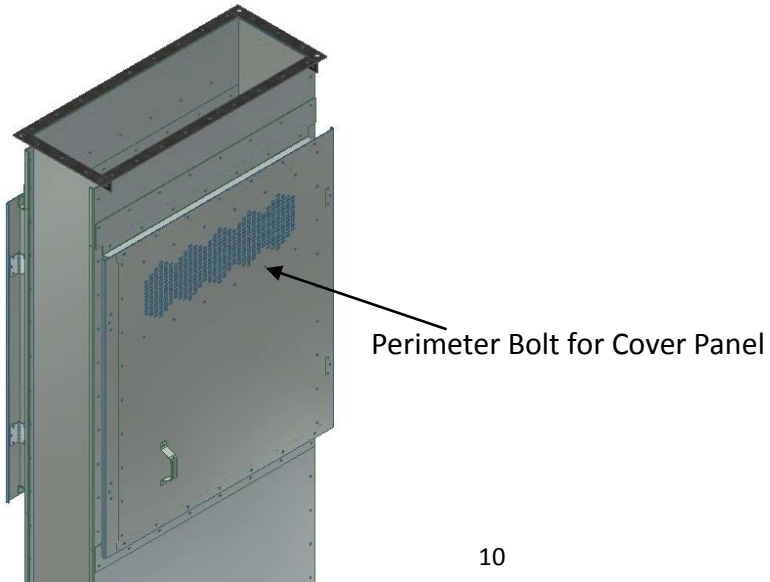


Inspection Trunk Sections

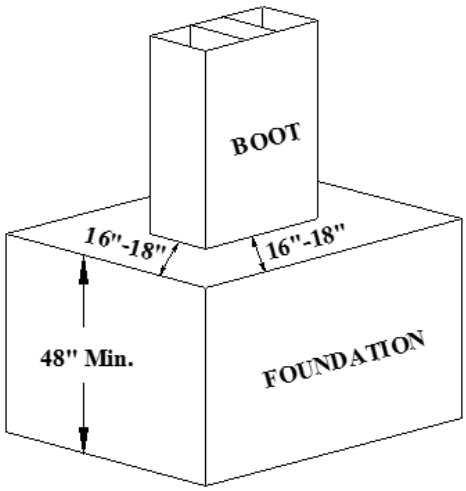
To open access door remove the door perimeter bolts and open door



To open inspection viewing window remove the window perimeter bolts and remove cover panel



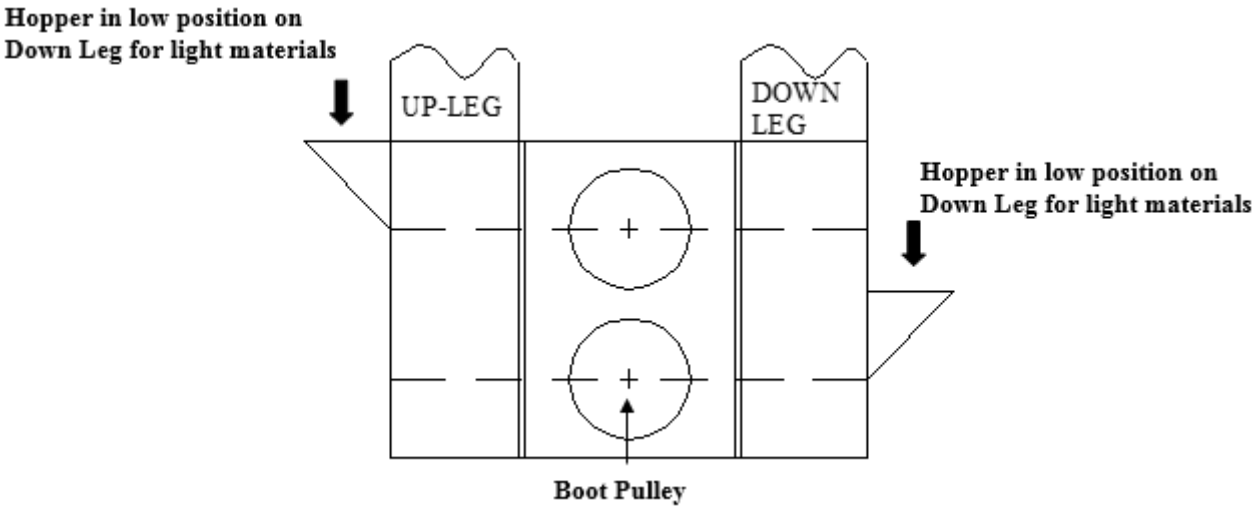
Consult a qualified engineer or contractor for recommendations on concrete reinforcing for the elevator foundation. The design must take consideration into dead loads, live loads, wind loads, and soil bearing capacity. The boot should be installed on a foundation that provides for adequate drainage to ensure that it stays dry. We have made some suggestions below on boot foundations but due to the various situations these should not be used without further insight to your specific application.



Foundation should be a minimum of 48” in depth. Length and width approximately 16”-18” from base of the boot.

Take time to identify the up and down sides of the boot before installing. After the boot is set into place it needs to be level in all directions prior to anchoring. Remove the boot cover and use a level that will span at least the width of the boot. Metal shims can be used around the perimeter of the boot to achieve a level and plumb position. Once the boot is in a desirable position use anchor bolts to secure the boot to the foundation.

Once the boot is installed the inlet hopper can be installed on either the upside or the downside of the boot, in a high or low position. Most free flowing materials such as grain are best fed into the boot on the up leg side in a high position. Feeds or light materials that tend to dust should be fed on the down leg side in a low position for max filling of the buckets. If mounting hopper on up leg in high position the bottom of the hopper should be no lower than the center line of the pulley in its highest position. If mounting on the downside low position the hopper inlet should be no higher than the center line of the pulley in its lowest position. Proper positioning of the inlet hopper is critical to the performance of the bucket elevator. Loss of elevator capacity will occur if buckets are not properly fed with incoming material. Boot hoppers are shipped separately and need to be installed to boot end panels

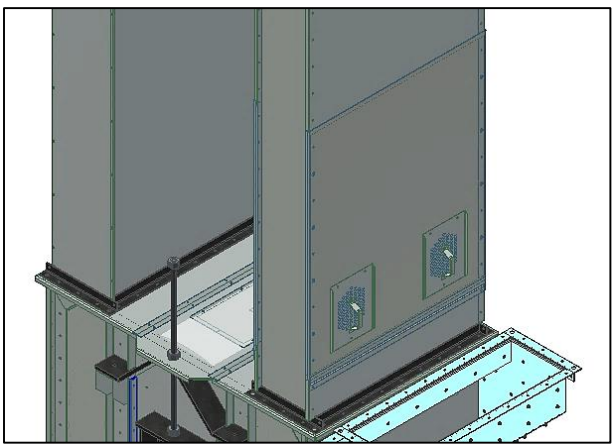


Do not leave any open space on boot ends above or below the hopper a tight seal needs to be maintained. All setscrews, and hub screws should be checked for proper tightness. The pulley should also be checked and adjusted if necessary.

Caution: End Panels should never be removed from a Boot section, this could cause an elevator to collapse resulting in extensive damage to the elevator and serious injury / death to those working in the area. If end panels are required to be removed a responsible individual should perform the task removing only one never both at a time. Lambton Conveyor takes no responsibility for injury, death, or damage resulting from the removal of the Boot section end panels.

Inspection Section

The inspection section of the bucket elevator has been designed for ease of installation and maintenance. Usually the inspection section is located on the up leg directly above the boot ideally at eye level for optimum service potential and should be specified by the owner upon ordering so we can accommodate to your needs. Depending on your application various lengths of trunking can be supplied to bring the inspection section to a desirable height. The inspection panel permits the installation of the belt and cups, while the inspection door allows you to check the filling of cups, and align the belt as needed. To install the belt and cups remove the front and back panels from the inspection section, these panels will be reinstalled after the belt and cups are in place.

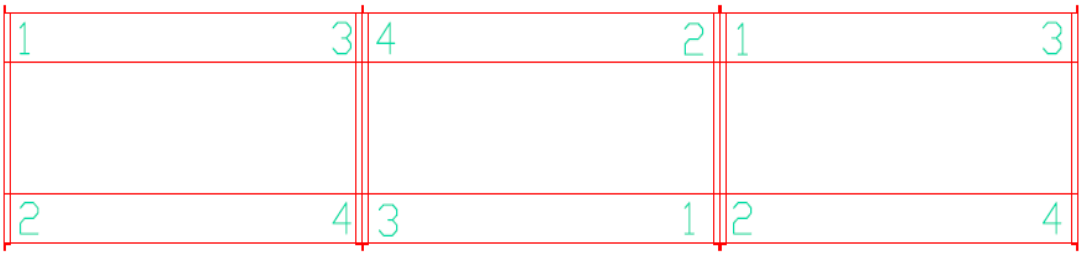


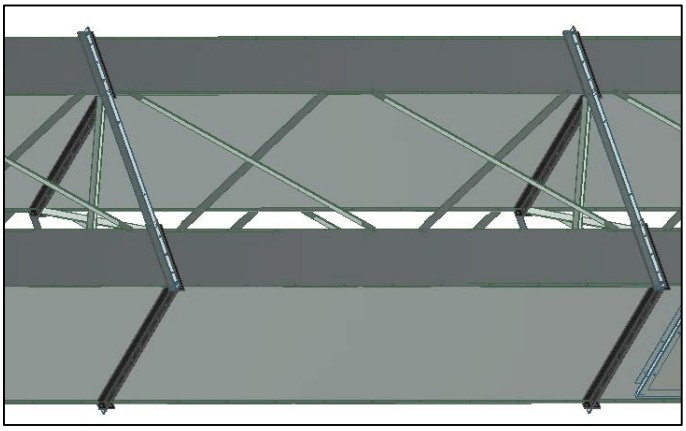
Trunking

Before the trunking is connected and installed the head, platforms, ladders and safety cages should be installed. Once all accessories are attached to the trunking caulking should be applied to the trunk connecting flanges while the sections are being connected. This will seal out any moisture and prolong the life of your elevator. Due to loading restrictions and safety concerns we recommend lifting 50' sections or less at one time. It is important to maintain plumb and square trunking in all directions. Initially this is done during assembly on the ground. It may be wise to have an electrician wire the elevator for power prior to it being raised and is also a good time to touch up any areas that the galvanized finish has been removed during assembly.

To raise the elevator remove the head cover and wire it to the service platform, now loop the crane cable around the head shaft and secure firmly. An additional line should be fastened to the bottom of the elevator and lifted using a loader or forklift, to prevent the trunk from dragging along the ground. This is for damage protection.

To prevent possible mis-alignment or twisting, assemble the trunk sections together as follows….
All trunk ends are punched with numbers 1,2,3 and 4. Match 3 with 4; and match 1 with 2 (refer to diagrams below).

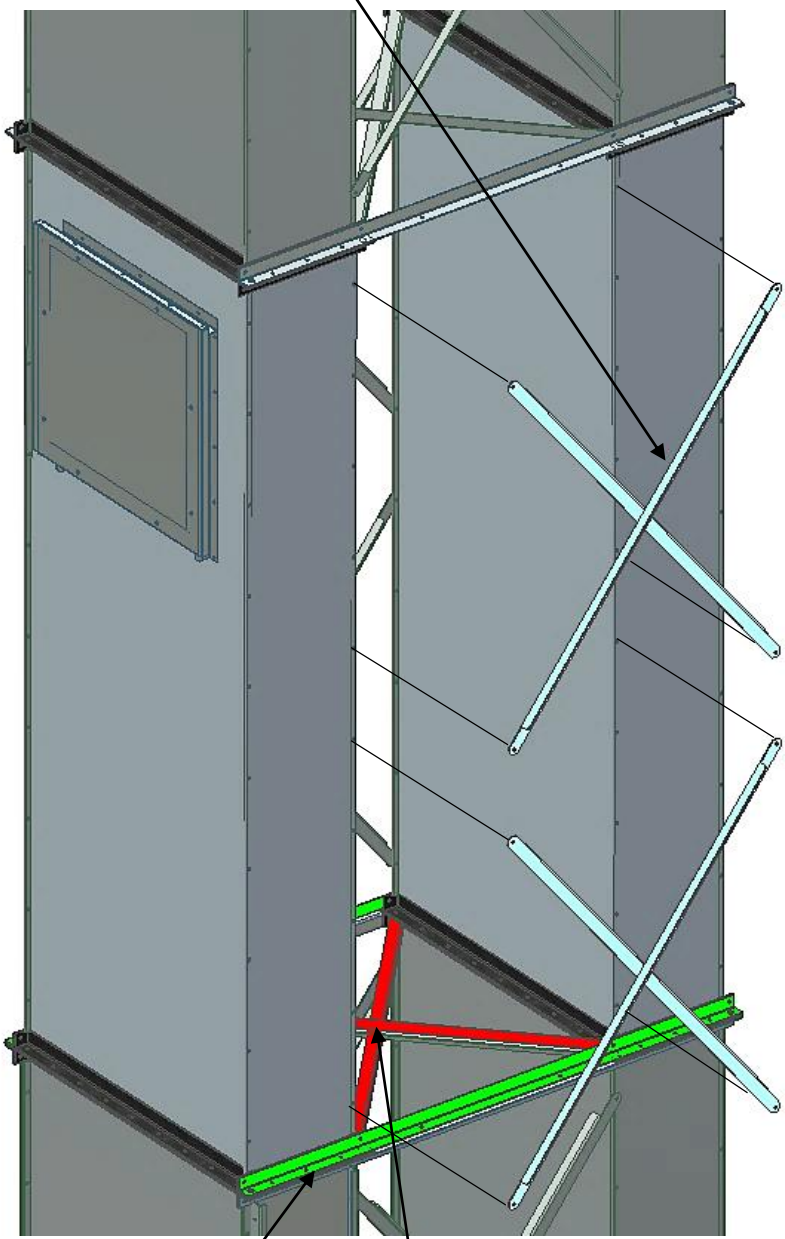


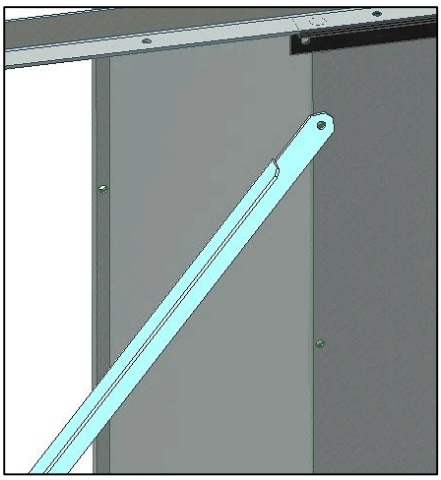


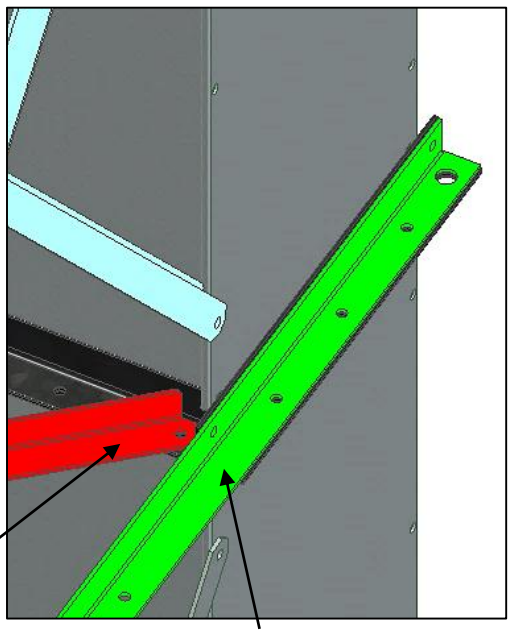
Cross Bracing and Tie Angles

All Models Include trunk cross bracing, vertical and horizontal along with tie bracing angle as shown.

Vertical X Bracing
Assembly to both sides of trunk







Horizontal X Bracing

Tie Bracing

Tie Bracing
Used at each joint when trunking is assembled

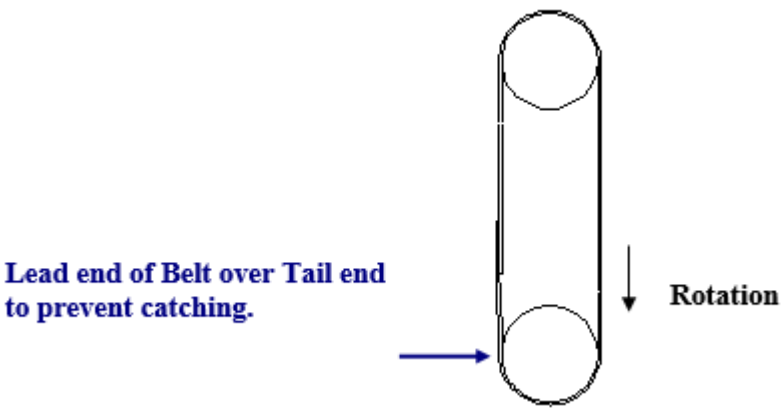
Horizontal X Bracing

Belt & Cups

The boot pulley should be adjusted to its highest position initially to allow for belt tensioning after the installation. Installing the belt can be accomplished many different ways; typically a rope is fed from the head section down through the up-leg to the open inspection panel. The belt is then attached and pulled up around the head pulley, fed down the down-leg, around the boot pulley and then spiced to the other end of the belt.

Splicing the belt may require the use of a come-along or similar tool. This is usually accomplished by overlapping the **lead end** of the belt as it comes up from the boot section over the face of the tail end of the belt. It is important that the belt is lapped such that it cannot catch as it travels around each pulley (refer to diagram for clarification). The belt should be lapped at least the length of 4-6 buckets for strength purposes.

Cup bolts are inserted through the punched holes in the belting from the backside. **Note: if one side of the belt appears to be smoother than the other cups should be attached to that side**. The cups are secured using flat washers, lock washers, and nuts on the bucket side. Nuts should be tightened such that bolt heads are set into the back of the belt firmly. Cups should be installed on the belt prior to installation



Motor & Drives

Prior to installing the drive assembly the head shaft should be checked for proper alignment and levelness. Shims can be used under the bearings to level the head shaft. A head pulley that is not aligned properly will prevent the belt from tracking properly.

Most drives consist of a motor and a reducer gearbox, or a jackshaft assembly. When using a reducer drive assembly follow the manufacturers instructions carefully to avoid damage. Sheaves should be installed as close to bearings as possible to prevent overhung loads and aligned using a straight edge to avoid excessive belt wear. The belts are then installed and tensioned by either the torque arm assembly or motor mount adjustment depending on the application. More info on the reducer and accessories is located in the manufacturers literature section of this manual. For info on sheave installation and torque specs refer to manufacturers instructions.

Note: Gear drives are shipped without oil do not operate the drive before filling with oil. Use the manufacturers recommended type and quantity found in the Manufacturers literature section of this manual.

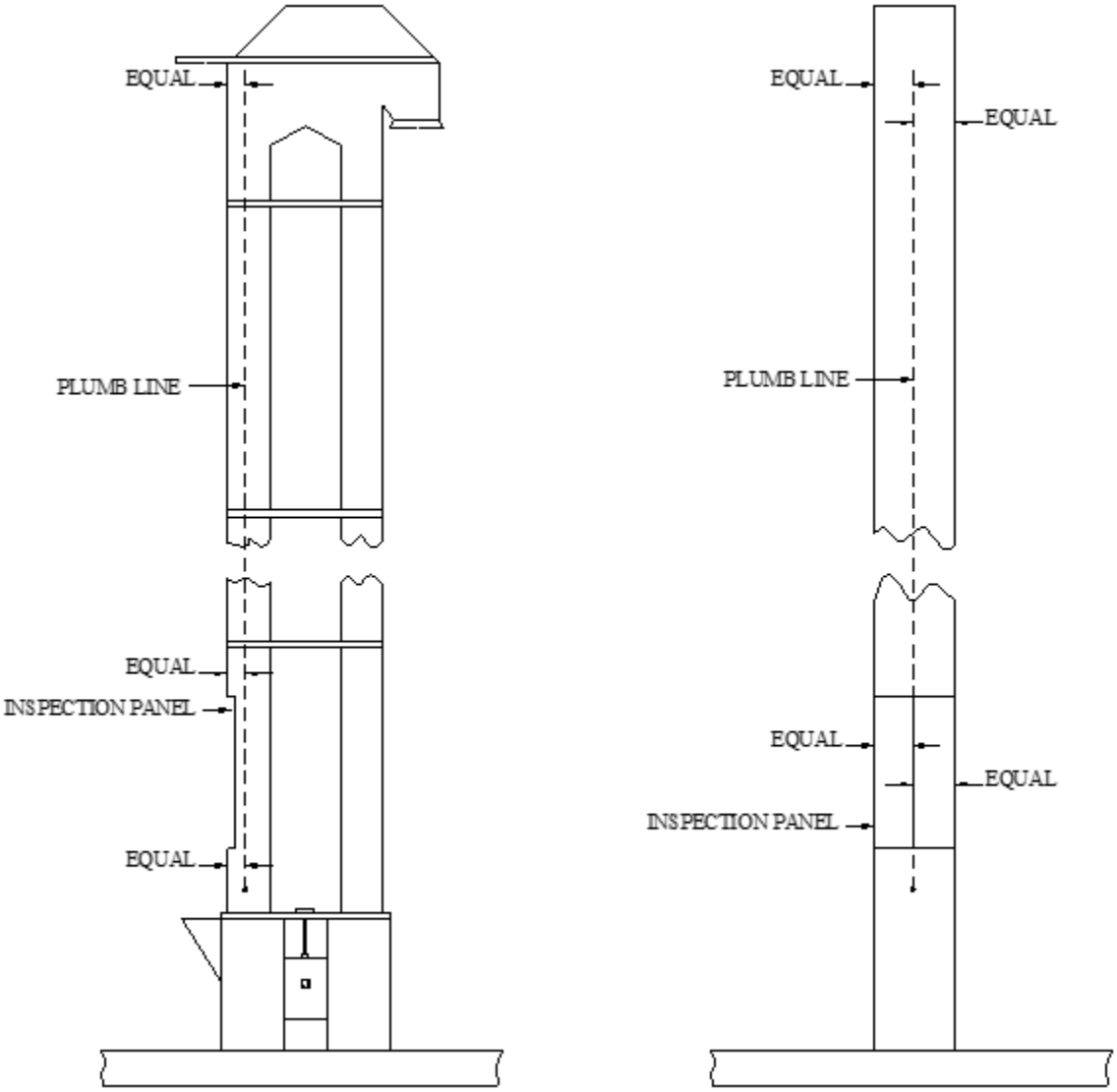
All guards should be installed when finished with the drive assembly. The elevator should never be run in any circumstances without the guards in place. Failure to follow these precautions could result in serious injury or death.

Lubrication

Reducers are shipped without oil; refer to Manufacturers section of this manual for type and quantity for your application. All bearings should be lightly lubricated before initial startup but fully lubricated during. Some bearings are equipped with auto greasers to prevent over lubricating. It has been our experience that most bearings are ruined from over lubricating rather than lack of it. Pressure guns tend to break the seals, in which they are unable to retain lubricant. Ensure that all employees are aware of this fact.

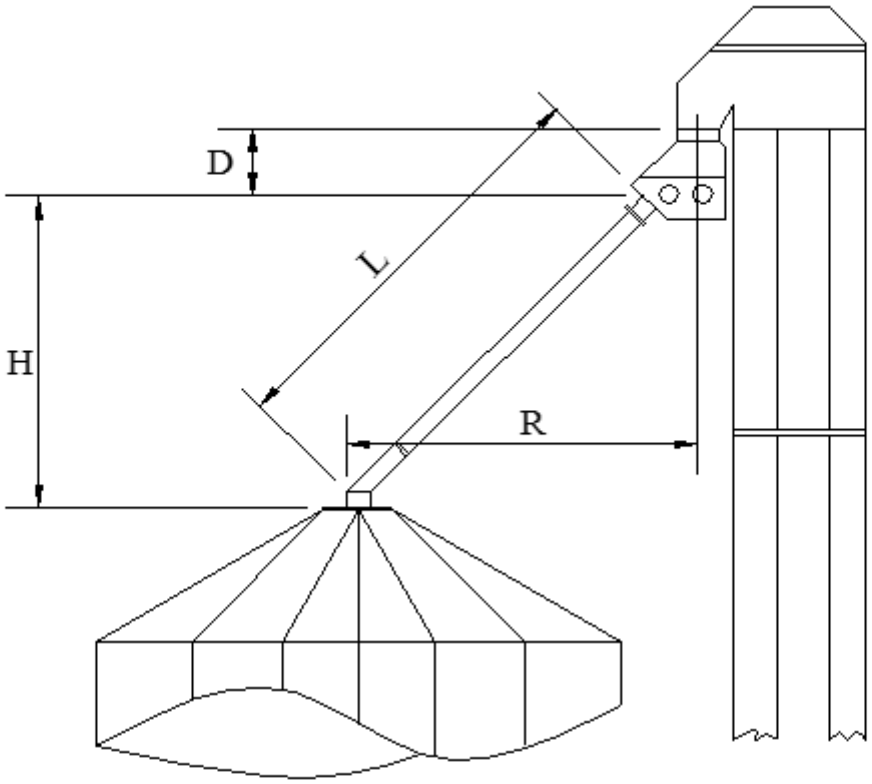
Plumbing

Various methods can be used to plumb the elevator including laser, transit, and plumb bob. Refer to below diagram if using the plumb bob method.



Spouting

Use the following diagram and chart to determine the lengths of spouting required for your application



R	Dry Grain 38°		Wet Grain 45°		Feed 60°	
	L	H	L	H	L	H
16	20 ½	12 ½	23	16	32	28
18	23	14	25 ½	18	36	31
20	25	15.5	28 ½	20	40	35
22	29	17	31	22	44	38
24	30	18 ½	34	24	48	42
26	33	20	37	26	52	45
28	35 ½	22	40	28	56	48 ½
30	38	23 ½	42	30	60	52
35	44	27	49 ½	35	70	61
40	50 ½	31	57	40	80	70
45	57	35	64	45	90	78
50	63 ½	39	71	50	100	87

D= Discharge Loss due to distributor or valves

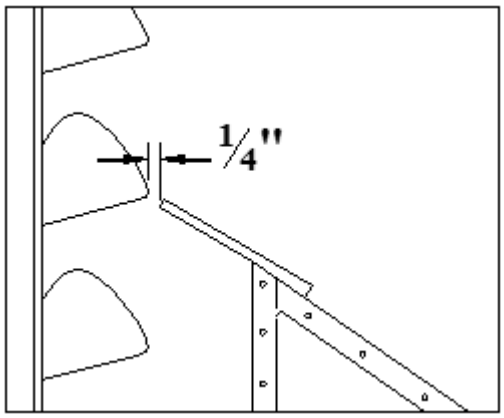
H= Height of spouting

L= Length of spouting

R= Distance to bin

Final Checks before Start-up

The cup flapper should be adjusted in the head discharge so there is approximately ¼" of clearance between it and the edge of the cups on the lap splice of the belt.



A final check of all parts to ensure that no foreign objects or tools have been left in the elevator is a good idea. All guards, inspections doors, and removable plates should be checked for proper placement. The boot belt tensioners need to be adjusted to tighten the belt on the pulley, adjust each side in small increments until the belt is tight. The drive should be turned by hand to check for proper rotation and clearance. Rotate the belt around a full rotation to check for any obstructions. Make any necessary adjustments. Finally check all setscrews to ensure they are tightened.

After a check of all mentioned components carefully run the elevator without load and check for any problems or necessary adjustments. Make certain that the belt is running in proper alignment, and operating over the centre of each pulley. If adjustments are needed first adjust the boot bearings as needed. If the belt is still not tracking correctly head pulley adjustments may be necessary. Shims can be used underneath the head pulley bearings to correct the belt alignment.

Once all sections of the elevator have been thoroughly checked, all adjustments have been made and proper lubrication is done the elevator can be run **without** load for several hours for an initial break in.
Look and listen carefully for any irregularities before running any material through the elevator.

Once you are satisfied with the operation of you elevator it can be put into use. At this point it may be a good idea to check your flow system. Be sure that valves & distributors if equipped are functioning properly.

A chart is located on the following page to assist you in recognizing and repairing any problems you may have with your elevator during start-up or in the future. We at Lambton Conveyor stand ready to assist you with any problems or concerns regarding the operation of our equipment. Feel free to call upon us at any time for information or assistance.

Problem	Cause	Solution
Back Legging	Loose Belt	• Adjust take-up • Shorten Belt
	Damaged/Missing Buckets	• Replace or repair buckets • Find cause
	Obstruction in discharge, distributor, or spouting	• Inspect, and remove obstruction • Repair
	Incorrect Spouting Angle	• Refer to page 14 for recommended spouting angles
	Overfeeding	• Check pit power output • Make adjustment at inlet
	Airlock	• Venting may be needed at boot or head
	Cup Flapper out of adjustment	• Refer to page 15 for spec
	Loose Buckets	• Tighten all bucket bolts firmly
	Overloading	• Check overloading capacity
	Wrong Head shaft speed	• Check sheave placement (if reversed)
Underfeeding	Buckets not full	• Check pit power output
Build-up on Buckets	Material wet or powdery	• Dry Material
Noise in Up-Leg	Buckets fully loaded	• System working well, full buckets will pump grain up leg for several feet
Belt runs to one side	Out of Plumb Head Bearings uneven Incorrect Belt Tension	• Re-check and align • Shim lower side until belt centers • Tension Belt correctly
Missing or Damaged Buckets	Belt Loose Leg not Plumb Obstruction within Leg Build-up on Pulley (ice, etc)	• Tighten take-up or shorten belt • Re-plumb • Repair or remove • remove buildup
Build up on Pulleys	Powder or Sticky Material	• Winged boot pulley required
Low Capacity	Air Lock	• Vent elevator head or boot • Vent bins that are being loaded
	Incorrect spouting size or angle	• Check recommendations
	Not feeding enough	• Insure required material is being fed at an adequate rate
	Loose Belt	• Check for slippage (snug belt) • Check head pulley lagging (replace if necessary)
	Baffle plate in conveyor hopper out of adjustment	• Raise baffle plate
	Wrong Head RPM	• Check specs. for **your** elevator
	Buckets Caked or Damaged	• Visually inspect, clean, or replace
Excessive Belt Slippage or Burning	Pulley Lagging is worn or loose Ice/moisture on head pulley Loose Belt	• Replace with recommended lagging • Run elevator to dry pulley (remove ice if significant) • Tighten take-up or shorten belt
Belt Excessively Loose	Stretched Belt	• Adjust boot pulley • Re-splice belt if necessary
Overloading of Leg	Pit conveyor running too fast Head Pulley running too slow	• Check conveyor speed • Check pulley speed, and reducer for correct gear ratio

The belt will stretch after installation and may need further adjustment. Some stretching can be expected during the first few weeks of operation. Belt tension should be maintained by adjusting the belt tensioners located on the boot section when needed. Belt tensioners should be adjusted in small increments until adequate tension is present. Once the belt tensioners have been fully used the belt will need to be re-spliced. Good belt tension is critical for proper traction on the pulleys and optimum performance.

Routine maintenance checks may include general wear, tightening of nuts and bolts, cleaning of electrical connections and switches, alignment adjustments, guy cable inspection, and lubrication of bearings, gearbox, and other necessary components.

Warning: Elevator needs to be locked out before any maintenance is performed.