

Safety, Installation & Service Instructions For BUCKET ELEVATORS

Warning: Important information contained in this manual to be reviewed and followed by contractor, installer, owner and operator.

700 Hoffman St.
Hammond, IN 46327
PH: 219-931-1450
Fax: 800-805-6527

915 W. Ash
Chanute, KS 66720
PH: 620-431-0440
Fax: 800-213-3086

781 Church St.
Winona, MS 38967
PH: 662-283-3142
Fax: 800-213-3084

7807 Doe Avenue
Visalia, CA 93291
PH: 559-651-2131
Fax: 800-651-2135

INTRODUCTION:

This manual contains instructions for the Safety, Installation, Operation and Maintenance of Bucket Elevators as manufactured by Screw Conveyor Corporation (SCC). The reliability and good service life of this equipment depends to a very large extent on the care taken in installing and otherwise preparing this equipment for its intended use.

Some bucket elevators are ordered and manufactured based on catalog information and engineering drawings are not required. Many others however are provided with drawings. Some are purchased with the requirement that assembly and detailed drawings are needed in order to produce the unit to accommodate a specific application. The drawings therefore serve the purpose of describing to the buyer or installer exactly what is being furnished and this enables the buyer or installer to determine more specifically what other equipment is needed to connect to the input of the elevator as well as connect to the output from it. Drawings are not however considered design drawings for the concept of a process or system.

There are several kinds of bucket elevators discussed in this manual.

- 1. The Double Trunk High Capacity Bucket Elevator.**
- 2. Large engineered Double-Trunk Elevators with pulleys 48" diameter and larger, some with bent knee pulleys designed for high speed.**
- 3. The Industrial Type Single Casing Elevators which may be furnished as Belt-Type or Chain-Type, and as Centrifugal Discharge or Continuous (Gravity) Discharge.**
- 4. Mill Duty Centrifugal Chain Type Bucket Elevators.**
- 5. Super-Capacity Continuous Elevators with buckets suspended between two strands of roller chain.**

The instruction for erecting any of these Bucket Elevators is generally the same. At least the principles for supporting, bracing, and cable guying follow the same general rules found here. If specific additional instructions are needed, contact Screw Conveyor Corporation.

SAFETY RESPONSIBILITY:

Electrical controls, machinery, guards, railings, walk-ways, arrangement of installation, training of personnel, etc. are necessary ingredients for a safe working place. It is the responsibility of the contractor, installer and owner, user to supplement the materials and services furnished by Screw Conveyor Corporation with these necessary items to make the installation comply with the law.

SAFETY:

Most accidents involving property damage or personal injury are the result of someone's carelessness or negligence. In order to avoid such accidents, one of the many things that must be done is to make machinery that eliminates in so far as possible an unsafe or hazardous condition. Bucket Elevators must be installed, maintained and operated with the following minimum provisions:

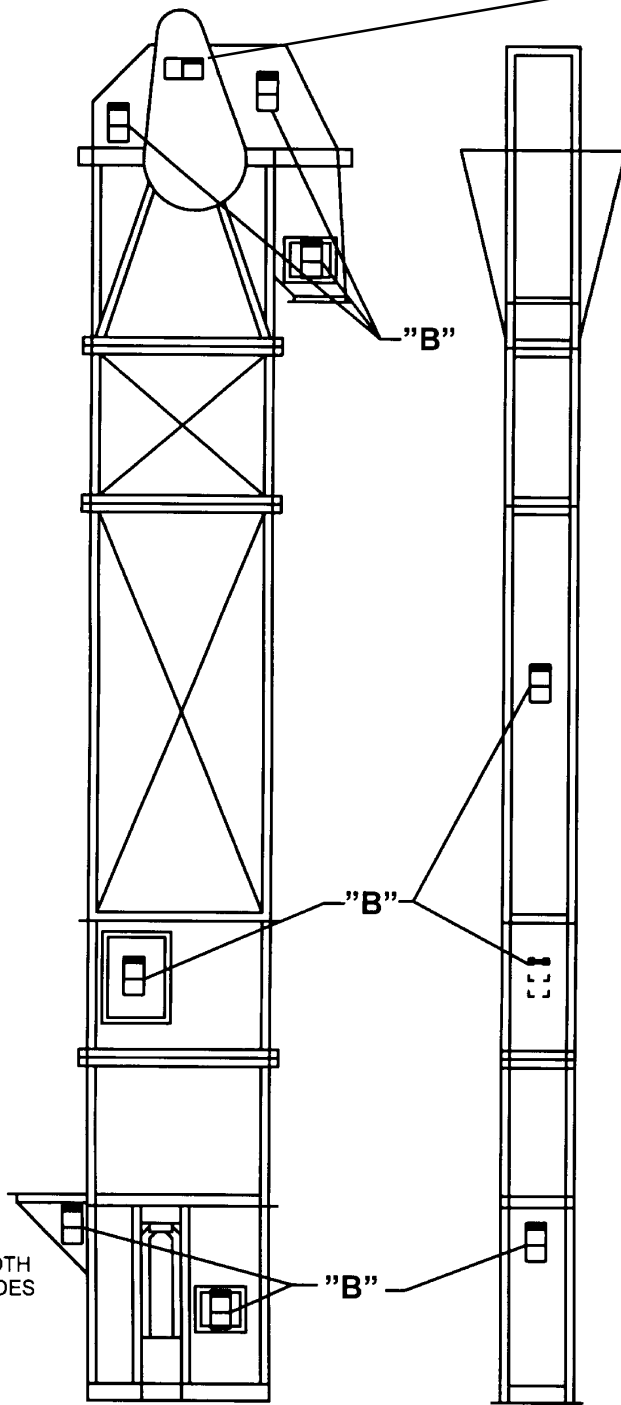
1. Bucket Elevators shall not be operated unless the elevator housing completely encloses the moving elements and all power transmission guards are in place. The following warning signs (see CEMA Safety Label sheet SC-4) are attached to all bucket elevator housings in locations as specified. Signs should not be removed from housings or be painted over! Replacements can be ordered from Conveyor Equipment Manufacturer's Association (CEMA).
2. Do not overload the elevator or use it for anything but its intended use.
3. Feed openings for shovel or other manual or mechanical equipment shall be constructed in such a way that the conveyor and elevator rotating and moving parts are enclosed.

Screw Conveyor Corporation can assist in the selection and design of the devices or equipment that will aid the owner and installer in preparing a safe installation and a safe working place. Zero speed switches and other electrical devices can sense elevator operation so that operations can be interrupted and/or alarms can be actuated.

There are many kinds of electrical interlocking devices for conveyors, elevators and conveyor systems such that if one conveyor or elevator in a system or process is stopped, other equipment feeding it, or following it, can also be automatically stopped and thus prevent overloading at transfer points.

Product: Screw Conveyors



Equipment: Bucket Conveyor

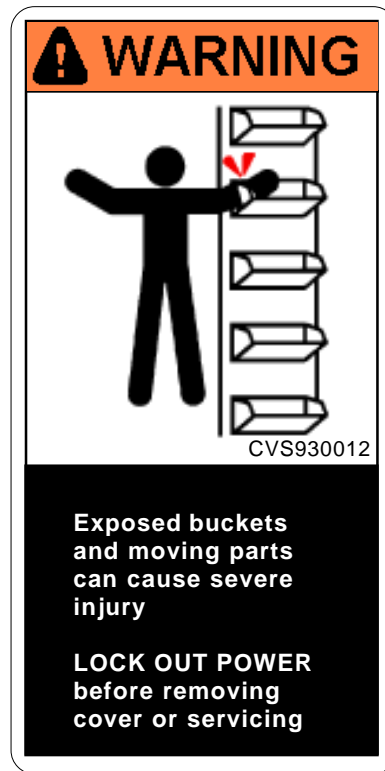


“A”

To be placed on removable guards to warn that operation of the machinery with guards removed would expose chains, belts, gears, shafts, pulleys, couplings, etc. which create hazards

USE LABEL “A” ON BELT GUARD
USE LABEL “B” ON EACH SIDE OF INTAKE, ALL BOLTED PANELS AND INSPECTION DOORS, AND BOTH SIDES OF SPLIT HOOD.

-  NEAR SIDE
-  FAR SIDE



“B”

To be placed on intakes, bolted guards and panels, hoods and doors of bucket conveyors to provide warning against exposing buckets and moving parts while in operation.

BOTH SIDES



SCREW CONVEYOR CORPORATION

SAFETY LABELS

INFORMATION AND PLACEMENT GUIDELINES

Safety is a prime consideration in the design, manufacture, installation, use, maintenance of conveyors, it is well recognized that in many instances, safety labels can increase operator and maintenance personnel awareness of the inherent hazards involved in conveyors or other types of moving equipment.

The process of designing and installing conveyors should be supervised by qualified personnel. The operation and maintenance of conveyors should also be performed and supervised by personnel trained to safely do so.

The purpose of this program is to provide guidelines for the selection and application of safety labels for use on conveyors and related material handling equipment. As part of the conveyor users' comprehensive safety program, the users of conveyors shall inspect and review safety labels to insure their integrity and maximize their effectiveness in injury prevention.

ANSI 535.4-1991

CEMA SAFETY LABELS

4.15 SIGNAL WORD:

The word or words that designate a degree or level of hazard seriousness. The signal words for product safety signs are DANGER, WARNING AND CAUTION.

4.15.1 DANGER:

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

4.15.2 WARNING:

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

4.15.3 CAUTION:

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTE:

DANGER or WARNING should not be considered for property damage accidents unless personal injury risk appropriate to these levels is also involved. CAUTION is permitted for property-damage-only accidents.

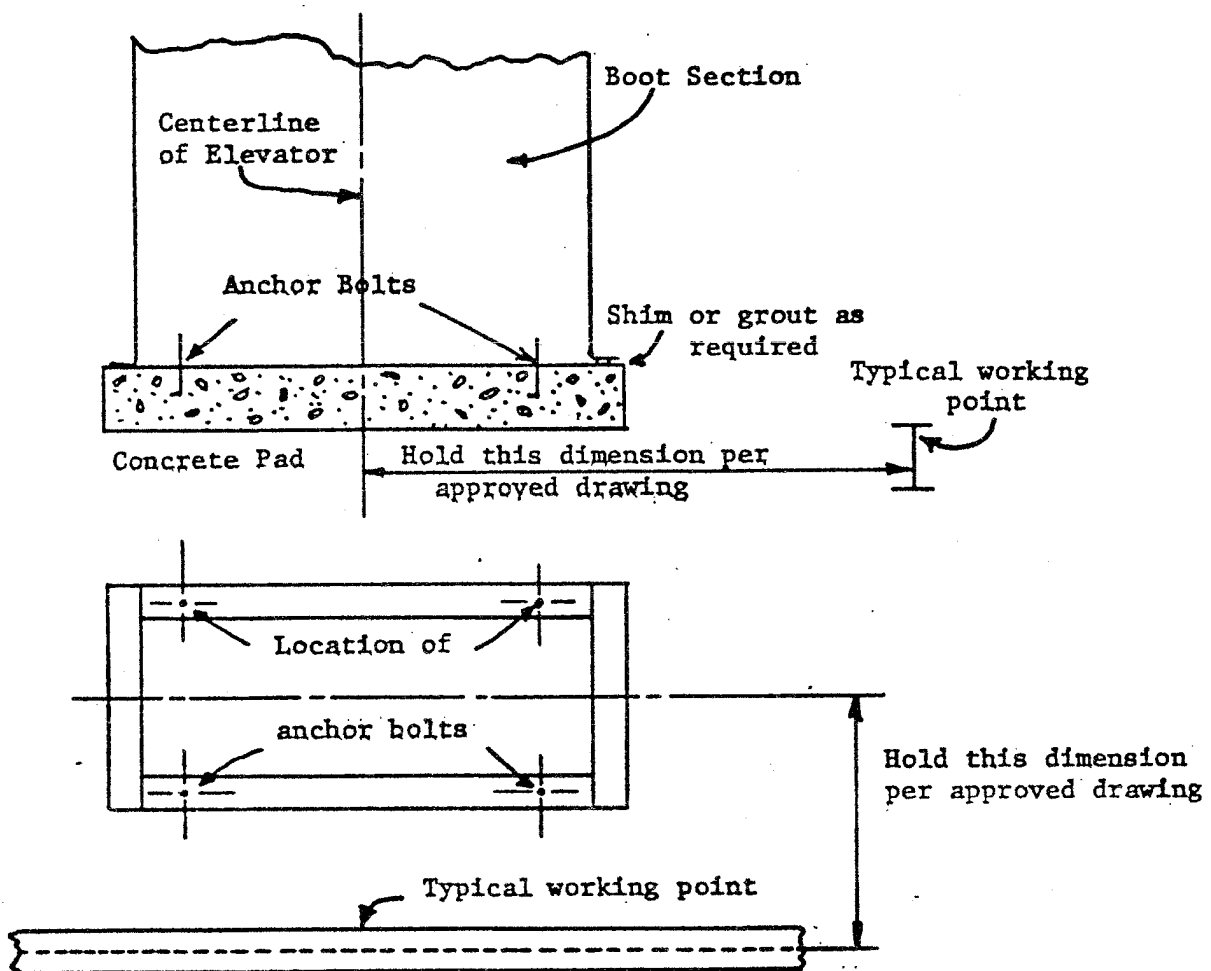
Safety labels can be obtained from:

Conveyor Equipment Manufacturers Association
5672 Strand Ct., Suite 2
Naples FL 34110
Ph: (239) 514-3441
Web Site: <http://www.cemanet.org>

INSTALLATION:

There are many methods for erecting bucket elevators and they will depend upon general conditions at the job site, the kind of hoisting equipment available and, of course, the size and rigidity of the elevator casing.

Before erecting steel, the concrete pad on which the elevator will be installed must be checked. There are two vital points to look for when checking the pad. See sketch below:



The anchor bolts must be positioned and the projection must be as shown on the general arrangement drawing. If the location of the anchor bolts is not correct this situation must be remedied at once. If the error is slight, it is possible to compensate for it by elongating the bolt holes in the boot section of the elevator. However, if the error cannot be corrected in this manner, the bolts will have to be relocated according to the general arrangement drawing.

Any sizeable error in locating the bolts would undoubtedly mean additional trouble later in the erection of the elevator. Tie-in points could be missed, loading and discharge areas misdirected and even interference from existing structures could be encountered.

The boot section should be placed over the anchor bolts. These bolts should be firmly embedded in concrete at least several days before erection of the elevator.



IT IS IMPERATIVE AND ABSOLUTELY ESSENTIAL THAT THE BOOT SECTION BE LEVEL HORIZONTALLY AND PLUMB VERTICALLY. IF THIS IS NOT ACHIEVED THEN THE BALANCE OF THE ELEVATOR WILL NOT LINE UP AND ITS OPERATION WILL BE SERIOUSLY AFFECTED!

Shim and grout as required to level the boot section. Use a carpenter's level on Flanges. When this has been accomplished and only then, secure the boot by tightening down the anchor bolts. Care must be exercised here not to disturb the alignment of the boot section.

The intermediate casing sections can now be assembled to the boot section. See the general arrangement drawing for the proper section and sequence of assembly. Be sure that the properly specified gasketing material is placed between all sections. The cross bracing shown in these data sheets should be fabricated in the field and bolted at the four corners before raising the section in place.

Some small bucket elevators can have some of their casing sections completely put together on the ground in a horizontal position and then carefully hoisted into position as a unit. The maximum number of casings which can be connected together on the ground in this manner and then hoisted into position depends in a great deal upon the size and rigidity of the elevator casing. On some mid to large size elevators it is recommended not to use this method of assembly for more than two casings at a time and for the larger elevators, to only hoist one casing at a time.



NOTE THAT ELEVATORS CAN SUPPORT THEIR OWN WEIGHT VERTICALLY BUT CAN BE EASILY DAMAGED HORIZONTALLY DURING ERECTION. BOLTING CASINGS TOGETHER ON THE GROUND AND THEN HOISTING THE ASSEMBLY UP AT ONE END CAN EXERT UNDUE STRESS ON THE CASINGS AND RESULT IN PERMANENTLY DESTROYING VERTICAL ALIGNMENT OR PLUMBNESS!

Each intermediate casing section must be plumbed to a tolerance of 1/8" maximum as it is assembled to the preceding section.

When plumbing the sections, secure the intermediate bolts only. The balance of the bolts should be inserted and tightened after section is plumbed before proceeding with the next section.

The flanges on the casing sections are not machined, and it is therefore possible that small fabrication inaccuracies, within structural tolerances, may be present. Check each section as it is placed in position and, if necessary, rotate 180 degrees. If inaccuracy is not compensated for, invert the section end over end. If necessary, the section as inverted may be rotated 180 degrees.

Naturally, sections with doors or openings cannot be inverted. However, it may be possible to rotate these sections 180 degrees to achieve plumbness.

If rotating and inverting do not achieve plumbness, it may be necessary to shim the casings at the flanges.

By employing the above erection practice, small variations are compensated for instead of compounded.



THE MAXIMUM OUT OF PLUMB TOLERANCE BETWEEN THE BOOT SECTION AND HEAD SECTION SHOULD NOT EXCEED 1/4".

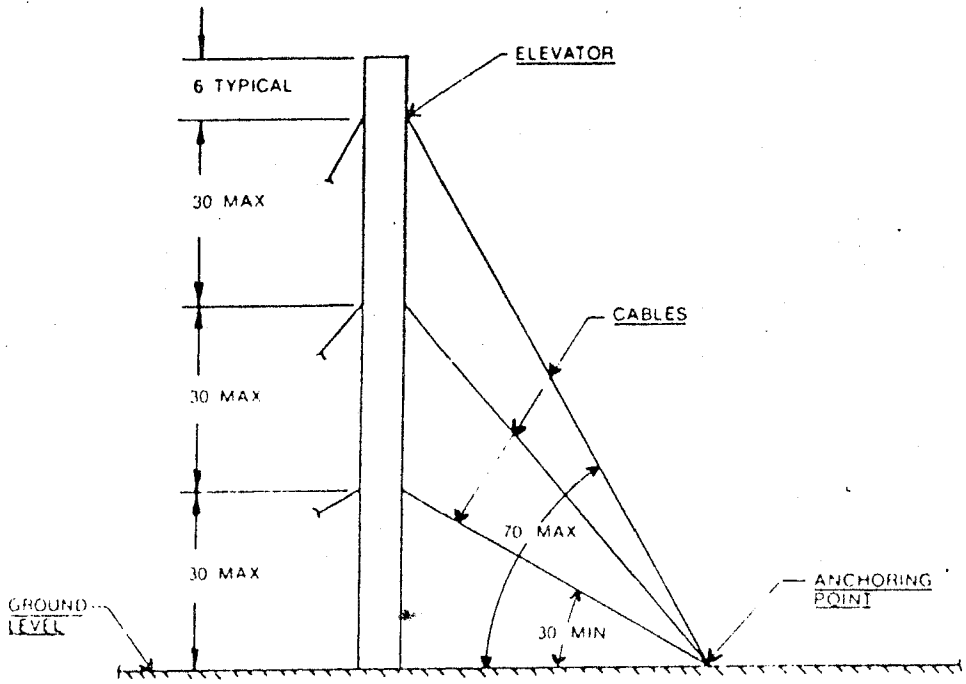
As a general rule, the bucket elevator casing must be braced or guyed at intervals of 30 feet.

For outdoor installation wind bracing must be furnished to fasten the elevator casing firmly to an adjoining structure. Bracing is first bolted to the casing, then shimmed, bolted and grouted to the supporting structure without disturbing the casing alignment. If no adjoining structures are available for an outdoor installation, then guying is required.

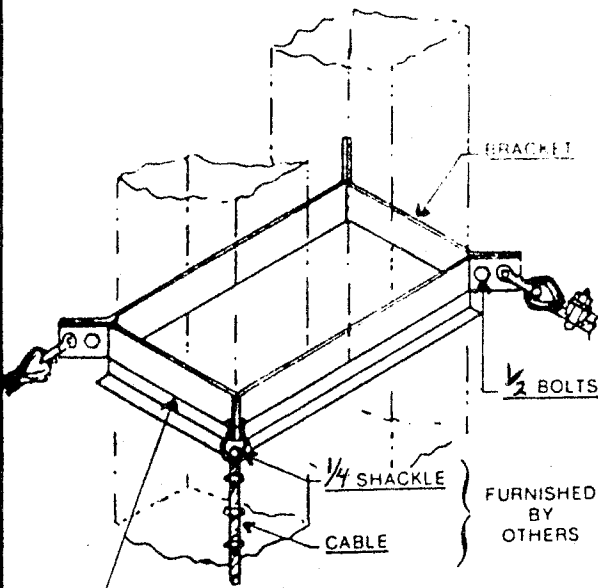
See Figure #1 for the guy wire connections and other instructions. You will note, the guy wires should not be installed at an angle to the horizontal less than 30 degrees, or more than 70 degrees. Guy wires should be stressed equally, and they should be adjusted and arranged so that they do not cause horizontal force against the casing which would tend to buckle it, nor should the cable be so slack or loose that it will not support the leg against the wind or movement from any other sources.

Do not under any circumstances attach guy wires to any part of a platform. All guy wires must be attached to the elevator casing.

GUYING RECOMMENDATION FOR BUCKET ELEVATOR

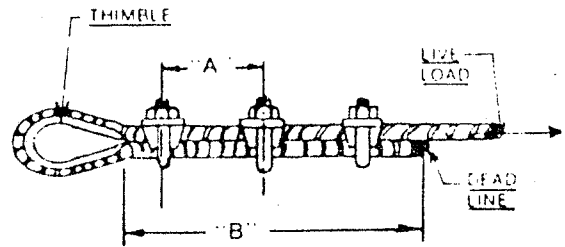


GUYING BRACKET



POSITION GUYING BRACKET ABOVE SECTION ANGLES AS SHOWN TO HOLD BRACKET FROM WORKING DOWN THE LEGGING.

CABLE



ROPE DIAMETER	MINIMUM NUMBER OF CLIPS REQUIRED	"A" (MINIMUM)	"B"
3/16"	2	1-1/8"	8"
1/4"	2	1-1/2"	8"
5/16"	2	1-7/8"	10"
3/8"	2	2-1/4"	10"

Figure #1

Please note that the procedures followed in installing platforms, both intermediate landing/rest platforms, and top machinery service platforms as furnished by SCC depend upon the type of platform furnished. SCC supplies a “bolt between” style of landing and top platform as a “standard”. These types of platforms bolt between the leg casings or the top leg casing and lower head section and the platform becomes part of the assembled structural column. However, when requested or when platform elevations will be determined in the field, SCC may supply a “slip-on design” platform which does not bolt between casings.

The bolt-between type of platforms have a bolt hole pattern in the top and bottom structural members of the platform identical to the bolt hole pattern punched in the flanges of the leg casing sections. Usually platforms are bolted into position between casings, or casing and head section, while in a horizontal position on the ground and then hoisted into vertical position for assembly.

The slip-on type of platforms are usually mounted after the elevator column has been erected. The platforms slip over the leg casings at the desired elevation with supplied structural channels welded to the casings directly underneath the platform structural, thereby supporting the platform. In addition, the platform structural are usually also welded to the casing and often knee bracing is added from the platform back to the casings at 45 degrees.

The head assembly can now be assembled to the balance of the elevator. Note that the head shaft must be level and parallel with the boot shaft. If necessary, shim under the bearings to achieve this condition.

It should be noted here that most single trunk elevators are furnished with a boot pulley or sprocket smaller than the head pulley or sprocket and that the boot shaft has been assembled forward or towards the loading side of the elevator. This is shown on the general arrangement drawing.

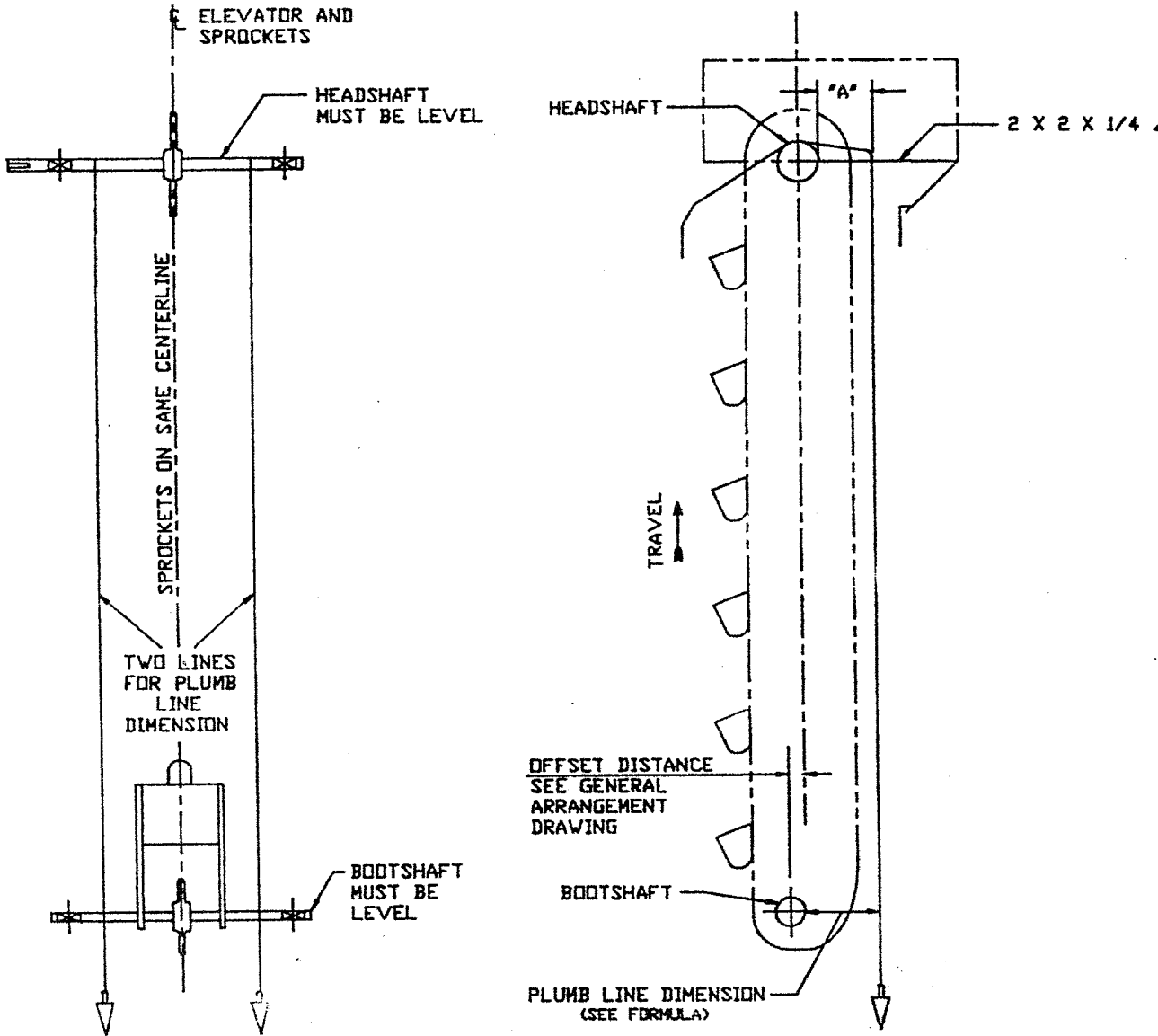
This offset is half the difference between the diameter of the head pulley/sprocket and the boot pulley/sprocket.

The boot shaft is mounted in this position at the factory. Nevertheless, two plumb lines dropped from the head shaft, each near the end of the shaft, must be used to check parallel position of the head and boot shafts. This should also be used to check the correct centerline offset of the head and boot shafts.



CARE MUST BE EXERCISED IN CHECKING THE OFFSET DISTANCE AS THE HEAD AND BOOT SHAFTS ARE USUALLY NOT THE SAME DIAMETER.

To plumb a head shaft when the elevator has an internal gravity take up assembly in the boot section, it is necessary to drop the plumb line away from the head shaft. To do this, file two notches in an angle and place this across the bearing pads parallel to the head shaft. (See Figure #2).



$$\text{PLUMB LINE DIMENSION} = \left(\frac{\text{HEADSHAFT DIA.}}{2} \right) \text{ MINUS } \left(\frac{\text{BOOTSHAFT DIA.}}{2} \right) \text{ PLUS (OFFSET DISTANCE) (PLUS "A" IF ANGLE IS USED)}$$

Figure #2

The drive equipment may now be mounted to the elevator. Depending upon customer preferences at order placement, the elevator may or may not be furnished with drive equipment from SCC. And, again depending upon customer preferences, may be furnished as components only, or an assembled drive.

Note that if the drive equipment is furnished by SCC, it may consist of one of the following types of drives:

- A shaft mounted reducer with the motor mounted on the reducer with a v-belt drive from motor to reducer.
- A shaft mounted reducer with the motor mounted on a fabricated motor mount on the head section with a v-belt drive from motor to reducer.
- A concentric reducer with a direct coupled motor all mounted on a fabricated motor mount on the head section and direct coupled into the elevator head shaft.
- A concentric reducer with a direct coupled motor all mounted on a fabricated motor mount on the head section with a roller chain drive from reducer to elevator shaft.
- A concentric reducer with a direct coupled motor all to be mounted on the elevator platform (or other structure such as a building floor on an inside installation) and connected to the elevator head shaft with a roller chain drive.

If the reducer is shaft mounted, then the head section requires a heavy duty torque arm bracket. If torque arm bracket is not present on head section, one should be fabricated from a minimum of 6" channel with support gusseting.

Most elevator drives furnished by SCC include anti-reverse rotation backstop, either internal or external to the gearbox, or some other type of positive stopping device. These prevent reverse rotation if the elevator is stopped under load. Obviously these devices must be installed so that they allow shaft rotation in the correct direction.

If a backstop was not ordered, specified or furnished with the bucket elevator, then it will be necessary to stop feed to the elevator and discharge material from all buckets before elevator is shut down.

Note that the backstop is an emergency device only, and should not be used to prevent backward actions under normal conditions.



REDUCER IS SHIPPED WITHOUT OIL. BEFORE STARTING, FILL TO LEVEL INDICATED WITH PROPER OIL SELECTED FROM CHART IN REDUCER MANUAL!

BELT INSTALLATION:

Before installing the elevator belt and buckets (if the elevator is a belt-type elevator), the housing must be secured with guy wires and/or structural steel bracing and must have all pulleys in place, with pulley set screws tight. The boot pulley (or head pulley if unit has top take-ups) should now be adjusted to the top (or bottom if top take-ups) of its take-up position.

The belt must be pulled over the head and boot pulleys and spliced before installing the buckets. It is important to note that many belts will be furnished with thicker covers on the bucket side, and thinner covers on the pulley side. Belts are normally marked “pulley side” or “bucket side”. If the belt isn’t marked, note that most of the time belts are shipped in a coil with the “bucket side” on the outside which lends itself to easily decoiling the belt over the top pulley. However, if in doubt, physically check the belt to make sure that it is properly positioned over the pulleys.

Note that there are several kinds of belt splices (see Figure #3).

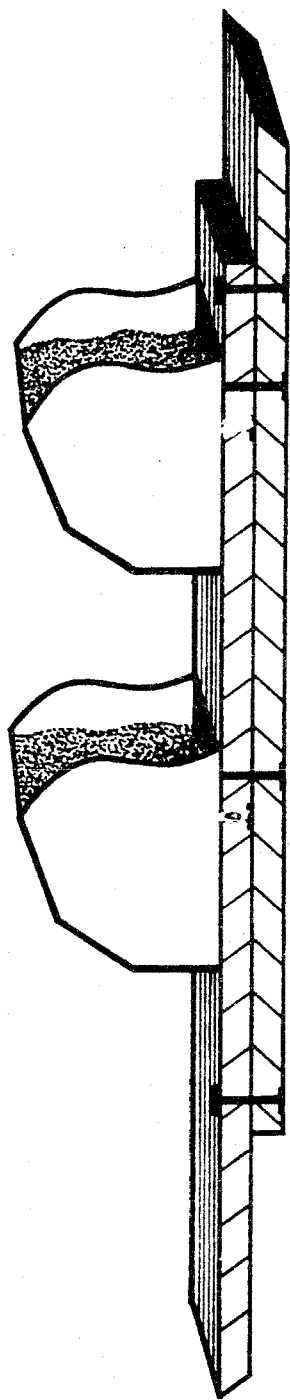
There are mechanical belt splices which consist of metal connectors that bolt or are otherwise fastened to the ends of the belt. The ends of the belt must be pulled up tight and they must be cut square to the length of the belt. Separate instructions are issued for mechanical splices and if used, secure these instructions before installing.

Other mechanical fastening systems (not shown in Figure #3) utilize either non-ferrous metal clamps, or a series of flat bars, to pinch the ends of the belting together with the assembly projecting out between buckets.

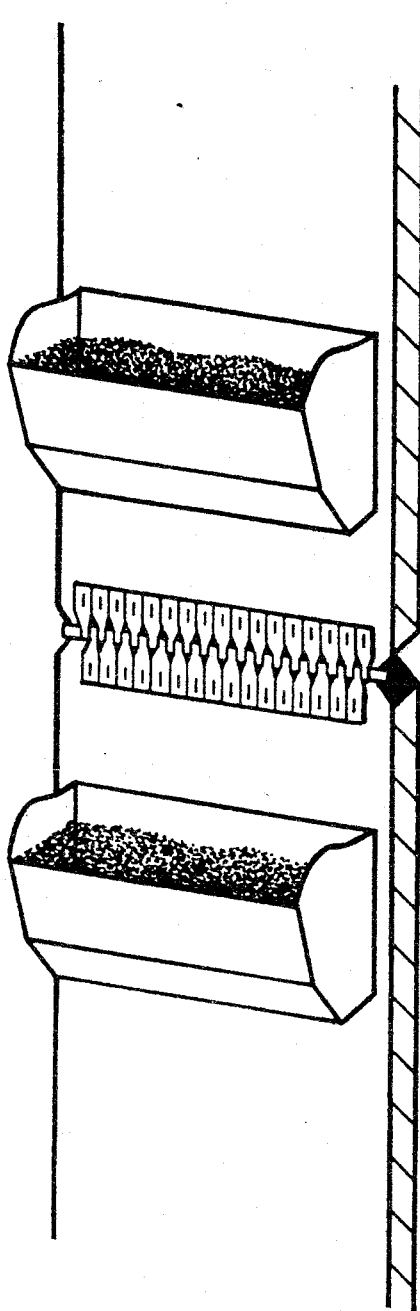
The most common splicing method is the overlap belt splice. The lap splice is one where the ends of the belt are overlapped and fastened together by the use of buckets and bolts in the lap area. A second lap method is called the butt rider (or butt joint) where the ends of the belt are butted together and then a rider strap of the same belting material is used on the bucket side. Again, buckets and bolts are used to secure assembly. A minimum lap is three times the belt width or a minimum of three buckets spacing, or both.

It is important to note that if using a lap splice, that the belt layer of the splice which contacts the pulley should be installed so that the edge of the belting going from two thicknesses to one thickness “falls” onto the pulley surface. If the belting is installed with the edge of this layer of belting butting into the pulley then premature pulley wear can occur to the pulley lagging.

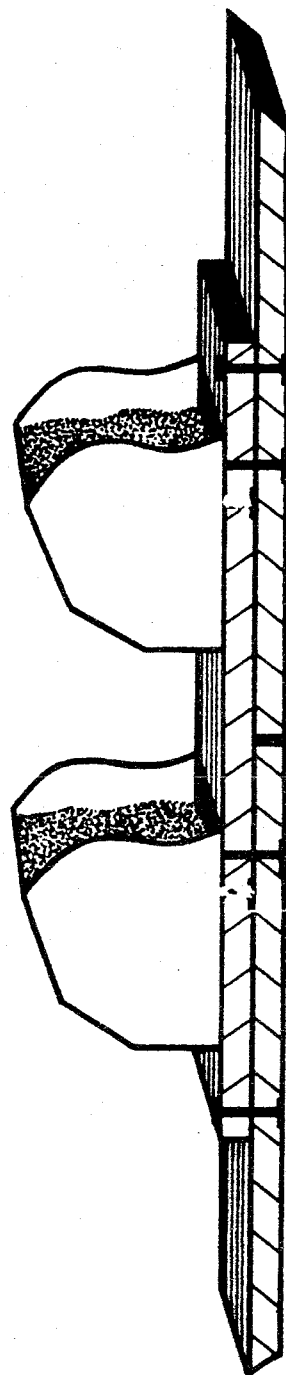
METHOD OF ELEVATOR BELT SPLICING



LAP SPLICE

MECHANICAL
FASTENERS

(Splice equal to approx.
50% of belt tensile)



BUTT JOINT

CHAIN INSTALLATION:

Before installing the elevator chain and buckets (in a chain-type elevator), the take-ups must be moved to their minimal position. Sprockets must be secured with set screws and shafts also secure in the bearing so that the shafts can not move endwise.

Where it is possible to lower the elevator chain from the top of the elevator casing, the following method can be applied:

Assemble the chain to form a single strand. Affix a lifting hitch off center of strand, to make one leg long enough to go around the boot sprocket and up to the inspection door. Lower assembled strand into casing from the top. When chain is positioned snub the head shaft. Connect at inspection door using a come-along or chain fall to draw the chain ends together. Adjust take-ups.

When the elevator chain cannot be lowered from the top of the elevator casing, assemble the chain and feed it through the inspection door. Drop a line into the far side (opposite inspection door) of casing from the top. Using an air tugger, or other means available, feed the chain around the bottom of the boot sprocket and upward to the top of the head sprocket. When chain is in this position, snub the head shaft. Connect the chain at the inspection door using a come-along or chain fall to draw the chain ends together. Adjust take-ups.

The method of installation is dependent, to a large extent, on the height of the elevator and the available hoisting equipment.

Bucket Installation:

Belt-Type Elevators: Buckets are intended to be installed through the inspection doors of the elevator usually on the upside of the leg casing. Norway flathead bolts are pushed through the back side of the belt and into the buckets. Bolts should then be tightened on the bucket side until the head of the bolt is firmly seated (see recommended torque for Norway elevator bolts below). There should be no projection on the back or the pulley side of the belt. It is suggested that only every 10th or 15th bucket be put on at first until sufficient buckets are on to keep the belt in balance until all buckets are installed. Be sure to use flat washers or fender washers when installing non-metal (poly) buckets.

NORWAY BOLT RECOMMENDED TORQUE

<u>Shank Dia.</u>	<u>Steel</u>		<u>Stainless</u>	
	<u>in./lbs.</u>	<u>kg./m.</u>	<u>in./lbs.</u>	<u>kg./m.</u>
1/4"	50	7	86	12
5/8"	96	13	177	25
3/8"	180	25	—	—

(Do not exceed recommended torque values as this may strip the bolts.)

Chain-Type Elevators: When AA, ACS or Continuous Steel buckets are furnished, assemble them to the chain with the head of the mounting bolt inside of the bucket. Assemble non metal (poly, nylon, urethane) buckets the same way but be sure to put a flat washer or fender washer between the bolt head and bucket.

Block the chain and mount approximately five (5) buckets. Snub the chain and rotate until the buckets are in the boot section. Mount five (5) more buckets. Fill in with the remaining buckets so that the weight of buckets is distributed equally to the front and back of the elevator to prevent chain from running away.

Note: The following torque values must be applied to the bucket bolts before the initial run and prior to welding the nuts to the bolts after the initial run.

- - Based on dry assembly.

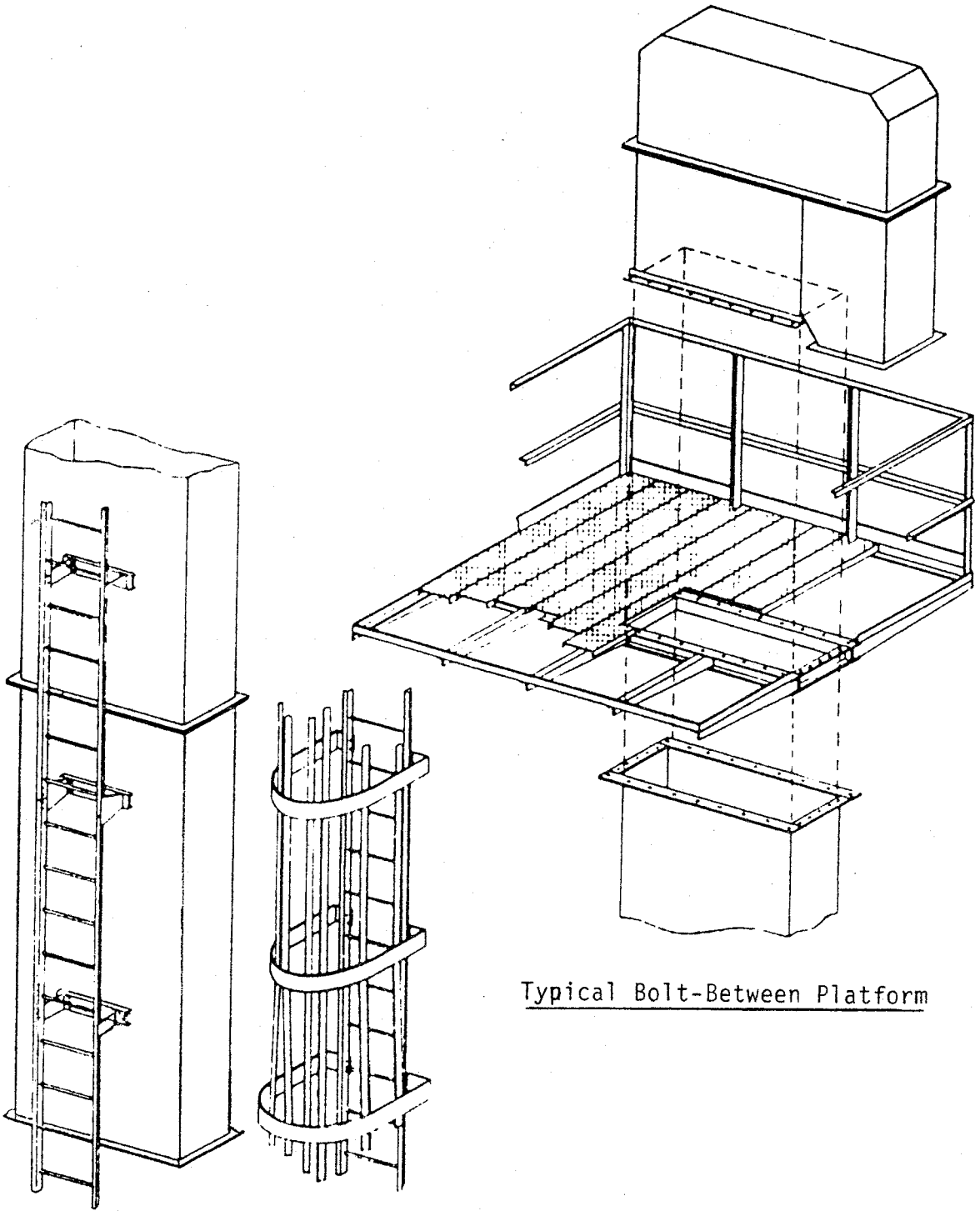
<u>Bolt Diameter</u>	<u>Torque Value</u>
5/16"	13 ft./lbs.
3/8"	23 ft./lbs.
1/2"	57 ft./lbs.
5/8"	111 ft./lbs.

On both belt-type and chain-type elevators, after an initial run of approximately 8 hours, the nuts should be retightened. On elevators using steel buckets we suggest welding the nuts to the bolts. In any event, the bolt threads should at least be upset to reduce the possibility of the nuts becoming loose.

LADDER & SAFETY CAGING:

Ladders are usually required on all elevators so that there can be access to the elevator head as well as access to the elevator boot from the working floor level. Most safety codes require that the ladder have a cage and that there be intermediate platforms spaced every 20 to 30 feet. This is necessary especially when the ladder is used frequently and by many people.

Figure #3 shows generally how a standard SCC service ladder is to be attached to the elevator housing and how the safety caging is fastened to the ladder. This equipment can be installed piecemeal with the elevator casing or afterwards after the elevator casing or housing has been installed and braced. Figure #3 also shows a typical SCC "bolt-between" platform. (Check O.S.H.A. 1910).



Typical Bolt-Between Platform

TYPICAL ARRANGEMENT
OF
LADDER & CAGE

FIGURE #3

Initial Operation:



IT IS IMPORTANT TO NOTE THAT THE ELEVATOR TAKE-UPS (EITHER IN THE BOOT SECTION OR TOP TAKE-UPS ON THE HEAD SECTION) CAN EASILY BE OVER-TIGHTENED. TAKE-UPS NEED ONLY BE TIGHTENED TO THE POINT OF SUPPLYING SUFFICIENT TENSION (WHEN BELT CONFORMS TO CROWN SHAPE OF PULLEYS OR CHAIN ENGAGES THE BOOT IDLER SPROCKET). ANY TENSION BEYOND THIS POINT CAN DAMAGE ELEVATOR!



THE ADJUSTABLE THROAT PLATE WITH RUBBER LIP IN THE DISCHARGE THROAT OF THE ELEVATOR MUST BE ADJUSTED TO MINIMIZE CARRY-OVER OF MATERIAL INTO THE CASING (BACKLEGGING). THE LAST PARTICLES OF MATERIAL LEAVING THE BUCKET ARE DEFLECTED INTO THE DISCHARGE BY RUBBER LIP. FOR REPLACEMENT USE #50-60 DUROMETER LIVE RUBBER. RUBBER LIP WILL DEFLECT UNDER IMPACT OF MATERIAL AND WILL NOT CAUSE ANY INTERFERENCE. (SEE FIG. #4)

After the elevator casing has been erected and braced and connected to guy wires, and the take-ups adjusted to provide proper tension to the belt (belt-type) or chain (chain-type), the elevator should be run without load for approximately eight (8) hours. During this time, particular attention should be directed to the following:

1. Loud or unusual noise.
2. Excess vibration

3. **Bearings over-heating.**
4. **Drive unit over-heating.**
5. **Evidence of contact or scrubbing between inside of sidebars and traction wheels or sprockets (chain-type elevators).**
6. **Evidence of belt not tracking in the center of the pulleys (belt-type elevators).**

None of the above should be present if all installation instructions in this manual were followed.

Things to look for if any of the above conditions are present:

1. **Loose buckets. Throat plate wiper improperly adjusted and contacting buckets Trash material or tools present inside elevator.**
2. **Drive equipment inadequately braced. Belt or chain alignment (plumbness) problem.**
3. **Bearings inadequately lubricated. Extreme shaft(s) mis-alignment. Too severe overhung load on headshaft. Take-ups too tight.**
4. **Reducer inadequately lubricated. Extreme belt or chain mis-alignment. Improperly wired motor or incorrect voltage going to motor.**
5. **Chain mis-alignment due to elevator and/or shafts being out of plumb. Take-ups not equally adjusted or head bearings not equally shimmed (shafts not level).**
6. **Belt mis-alignment due to elevator and/or shafts being out of plumb. Take-ups not equally adjusted or head bearings not equally shimmed (shafts not level).**

It is also suggested that the hold back device (backstop) be tested at this time. While the unit is operating, turn off the power and check the holding action of the device. It should grab immediately without allowing the chain and buckets (or belt and buckets) to reverse their direction of travel.

Before starting normal operation, the belt (or chain) should be rechecked for tightness. Adjustments may have to be made. Check the guy wires and structural bracing to make sure that the elevator is secure and plumb under all conditions of use. All buckets should be retightened and the nuts should be welded to the bolts.

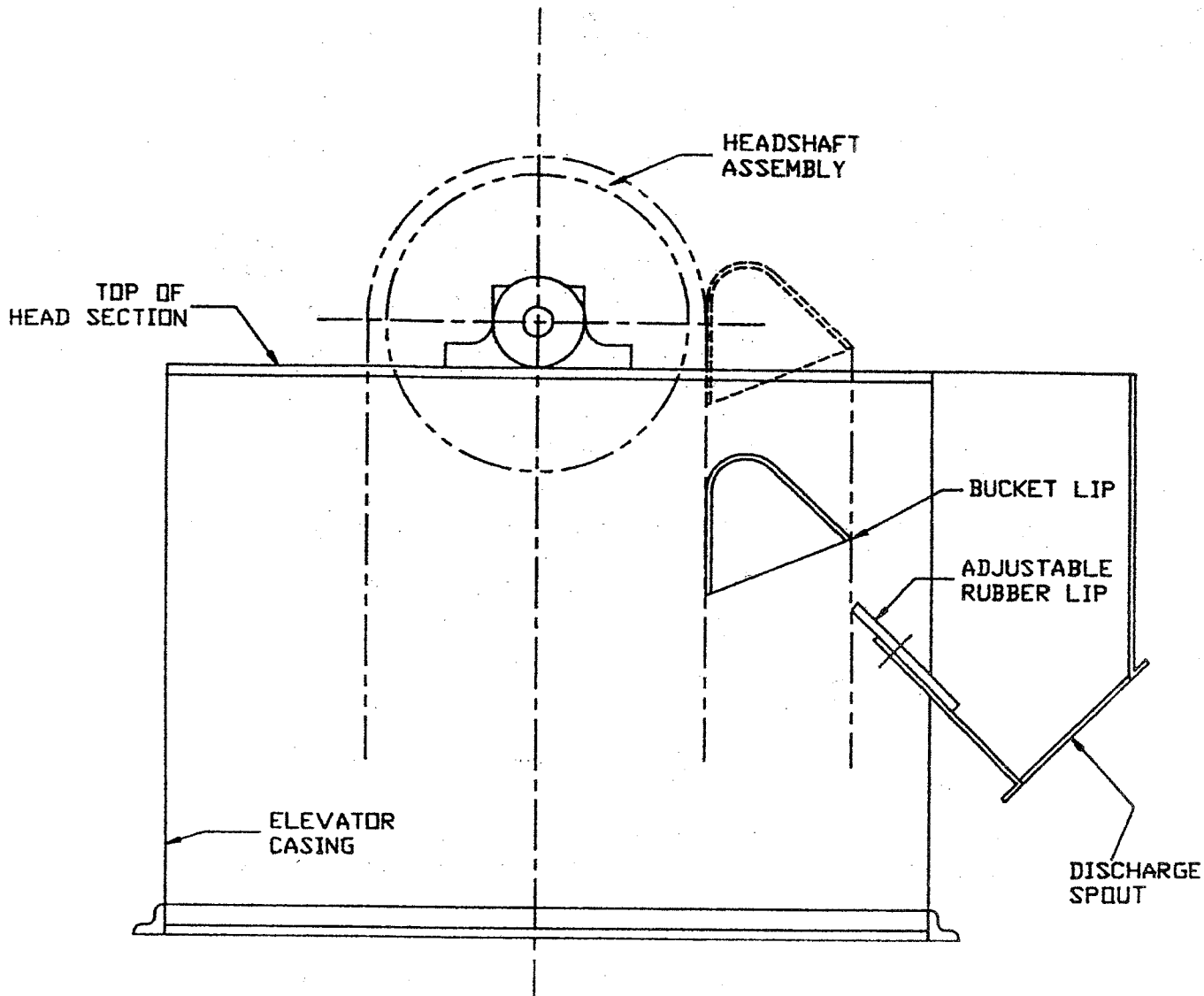


Figure #4

Normal Operation:

ELEVATORS SHOULD BE STARTED WITH BUCKETS EMPTY. STARTING UNDER LOAD PLACES UNDUE STRAIN ON CHAIN/BELT AND DRIVE MACHINERY. THEREFORE, IT IS IMPERATIVE TO ALLOW ALL BUCKETS TO EMPTY BEFORE STOPPING ELEVATOR.

Material should be centrally delivered at the specified uniform rate. Avoid loading buckets to the extent of material spilling back down into the boot section. Boot must NOT be allowed to pile up with spilled material.



BUCKETS ARE DESIGNED TO TRAVEL TO A SPEED AND CAPACITY ADAPTABLE TO THE TYPE. OF MATERIAL BEING ELEVATED. DO NOT MAKE ANY CHANGES IN MATERIAL, MATERIAL SIZE, MOISTURE CONTENT OR SPEED OF TRAVEL WITHOUT FIRST CONSULTING SCREW CONVEYOR CORPORATION.

The operator(s) should become familiar with all aspects of the construction and normal operating conditions of the equipment. Thereby, immediately recognizing an abnormal situation or operating condition before any serious damage occurs.

Assuming a correct and plumb installation of the unit, the bucket elevator in operation should be started with buckets empty. Starting under load places undue strain on chain or belt and drive machinery. It is imperative to allow all buckets to empty before stopping elevator.

Material should be centrally delivered at the specified uniform rate. Avoid loading buckets to the extent that material spills back down into the boot section. The boot itself must not be allowed to pile up with spilled material.

The elevator should be operated at its rated speed.

Before any elevator is placed into full operation or “put on the line”, it should have been “run-in” during which time we:

- Listen for - Loud or unusual noises.**
- Look for - Excess Vibration.**
- Feel for - Overheated bearings or drive units**

MAINTENANCE:

Once the unit is placed into full operation, a preventative maintenance program should begin. This program should include regular inspection set up on a periodic basis.

The preventative maintenance program should include a general inspection of:

- Buckets...for possible damage or loose bolts.**
- Adjustable throat plate...for adjustments to the rubber lip or replacement when required.**
- Adjustable take-ups...for proper tension**

Other items to be routinely inspected:

- **Elevator belt (in belt-type).**
 - Check for wear at the edges of the belting which would indicate that the belt is not tracking correctly and is contacting the sides of the casing.
 - Check for evidence of stretching. Some stretching is normal and must be periodically compensated for by re-splicing the belt and running the take-ups back to their highest (or lowest if they are top take-ups) position.
 - Check for delamination, tearing, missing elevator bolts or bolt heads pulling through the belting.

- **Elevator chain (in chain-type).**
 - Check side bars. Side bar inner faces should be checked for wear. This is an indication of misalignment.
 - Check for missing cotters. Missing cotters permit pin back off.
 - Check for insecure pins. Loose or unseated pins are danger signals and could lead to sudden and unexpected shutdown.
 - Check lubrication. See lubrication chart.
 - Check for excess material build-up. Excess material building up in chain and attachments will prevent proper seating on sprockets and rough operation. Result: accelerated wear.
 - Check for rounded parts indicating wear.
 - Check sprockets for wear. Sprockets may show evidence of cupping or other wear marks.

- **Bearings**
 - Check operating temperature, signs of wear (noise) and lubrication.

- **Drives**
 - V-belts of v-belt drives...wear on belts...proper tension.
 - Roller chains of chain drives...lubrication...proper tension.
 - Oil in gearbox.

Practice good housekeeping. Keep the area around the elevator and drive equipment clean and free of obstacles to provide easy access and to avoid interference with the function of the elevator and drive.

Replacement parts can be identified from a copy of the original shipping list, invoice or drawing.

IT IS RECOMMENDED THAT THE FOLLOWING STANDARDS BE REFERRED TO PRIOR TO AND DURING AN ELEVATOR INSTALLATION:

B20.1–1996 American National Standard Safety Code for conveyors and related equipment.

B20.1–1996 American National Safety Standard for Mechanical Power Transmissioin Apparatus.

O.S.H.A. – General Industry – Safety & Health Regulations Part 1910.

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