

**DARABI
AND
ASSOCIATES, INC.**
Environmental Consultants

Suite A · 730 North Waldo Road, Gainesville, Florida 32601 · Phone: ²⁵²~~904~~/376-6533

September 4, 1997

Mr. A. A. Linero, P.E.
New Source Review Section
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: Anderson Columbia, Inc.
Mobile Crushing Unit

Dear Mr. Linero:

In response to your letter of August 13, 1997, we provide the following response:

1. The source can operate with visible emission of 10% for the conveyors and 15% opacity for the crushers.
2. An O&M Manual is attached. The water spray is provided within the crusher unit and the stockpiles.

Please feel free to call me should you have any question or concern.

Sincerely,

RECEIVED

SEP 05 1997

BUREAU OF
AIR REGULATION

DARABI AND ASSOCIATES, INC.



Frank A. Darabi, P.E.
President

FAD/lef[ANDCR.967]

Enclosure

cc: W. Hanks, BAR

ASTEC INDUSTRIES, INC.

**PORTABLE RECYCLE
CRUSHING PLANT
O & M MANUAL**

SERIAL NO. 82-105

FOR:

**ANDERSON COLUMBIA CO., INC.
LAKE CITY, FLORIDA**

Revision No. 0
February 15, 1982

Rec'd 5 Sept '97

INSTALLATION, OPERATING
AND MAINTENANCE
INSTRUCTIONS

GENERAL INSTRUCTION MANUAL

JEFFREY® CRUSHERS

JEFFREY



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JEFFREY MANUFACTURING DIVISION
DRESSER INDUSTRIES, INC.
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C. If Buyer wrongfully rejects or revokes acceptance of items or work tendered under this agreement, or fails to make a payment due on or before delivery, or repudiates this agreement, Seller shall at its option have a right to recover as damages either the price as stated herein (upon recovery of the price, the items involved shall become the property of the Buyer) or the profit (including reasonable overhead) which the Seller would have made from full performance, together with incidental damages and reasonable costs.

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Full risk of loss (including transportation delays and losses) shall pass to the Buyer upon delivery of products to the f.o.b. point. However, Seller retains title, for security purposes only, to all products until paid for in full in cash and Seller may, at Seller's option, repossess the same, upon Buyer's default in payment hereunder, and charge Buyer with any deficiency.

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A. Seller warrants only that the products and parts manufactured by Seller, when shipped, and the work performed by Seller (including installation, construction and start-up), when performed, will meet all applicable specifications and other specific product and work requirements (including those of performance), if any, of this agreement and will be free from defects in material and workmanship. All claims for defective or nonconforming (both hereinafter called defective) products or parts under this warranty must be made in writing immediately upon discovery, and in any event, within one (1) year from shipment of the applicable item unless Seller specifically assumes installation, construction or start-up responsibility. All claims for defective products or parts when Seller specifically assumes installation, construction or start-up responsibility, and all claims for defective or nonconforming work must be made in writing immediately upon discovery and, in any event, within one (1) year from completion of the applicable work by Seller, provided, however, all claims for defective products and parts must be made in writing no later than eighteen (18) months after shipment. Defective and nonconforming items must be held for Seller's inspection and returned to the original f.o.b. point upon request. THE FOREGOING IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES WHATSOEVER, EXPRESS, IMPLIED AND STATUTORY, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS.

B. Upon Buyer's submission of a claim as provided above and its substantiation, Seller shall at its option either (i) repair or replace its product, part or work at the original f.o.b. point of delivery or (ii) refund an equitable portion of the purchase price.

C. Notwithstanding the foregoing provisions of this WARRANTY AND LIMITATION OF LIABILITY Clause, it is specifically understood that products and parts not manufactured and work not performed by Seller are warranted only to the extent and in the manner that the same are warranted to Seller by Seller's vendors, and then only to the extent that Seller is reasonably able to enforce such warranty. In enforcing such warranty, it is understood Seller shall have no obligation to initiate litigation unless Buyer undertakes to pay all cost and expenses the reform, including but not limited to Attorney's fees, and indemnifies Seller against any liability to Seller's vendors arising out of such litigation.

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Seller agrees to assume the defense of any suit for infringement of any United States patents brought against Buyer to the extent such suit charges infringement of an apparatus or product claim by Seller's product in and of itself, provided (i) said product is built entirely to Seller's design, (ii) Buyer notifies Seller in writing of the filing of such suit within ten (10) days after the service of process thereof, and (iii) Seller is given complete control of the defense of such suit, including the right to defend, settle and make changes in the product for the purpose of avoiding infringement. Seller assumes no responsibility for charges of infringement of any process or method claims, unless infringement of such claims is the result of following specific instructions furnished by Seller.

8. SPECIAL TOOLING

Notwithstanding any tool, die or pattern charges or amortization in connection herewith, all special tooling and related items shall be and remain the property of Seller.

9. NOTICE

Dresser Industries, Inc., values highly the confidence and good will of its customers and suppliers. We offer our products only on their merit, and we expect our customers to judge and purchase our products and services solely on the basis of quality, price, delivery and service. Likewise, Dresser buys only on merit, and we judge and purchase solely on the basis of quality, price, delivery and service. This Dresser corporate policy applies in all relationships with our customers and suppliers.

10. NOTICE

All past due accounts are subject to a service charge.

FOREWORD

This manual contains important information concerning the operation, installation and maintenance of your Jeffrey crusher. The instructions for Jeffrey crushers are divided into two manuals. The first manual contains general information for Jeffrey's complete line of crushers. The second manual contains specific instructions for your particular crusher.

The information contained in these manuals is general information. If you require more detailed instructions, contact your Jeffrey Representative. Refer to the serial number of your crusher found on the nameplate located on the side frame near the drive shaft.

Throughout Jeffrey Instruction Manuals there are many WARNING and CAUTION notes. The CAUTION notes alert you to procedures and instructions that prevent damage to the equipment or provide important instructions on operating procedures. However, the WARNING notes provide safety instructions designed to prevent injury to operating and maintenance personnel. These WARNINGS are not the only safety precautions to be followed while operating or maintaining industrial equipment of this type. Neither are they intended to replace plant rules, local or national codes. You should, of course, be familiar with and comply to local and national safety codes when they apply.

NUMBERS IN () ARE METRIC EQUIVALENTS

NOTICE: Contents of this manual are subject to change without notice.

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PLEASE FORWARD THIS MANUAL TO PROPER INSTALLATION AND MAINTENANCE PERSONNEL

INDEX

	Page	Page
SECTION I — GENERAL		
1-1 Introduction	1	
1-2 Crushing Methods	1	
1-3 Jeffrey Crusher Types		
a. Primary Impactor — Rockbuster and Coalbuster	1	b. Rotor Rotation
b. Primary — Roll Crushers	1	12, 13
c. Secondary — Hammermills	1	c. Rotor Speed
d. Secondary — Roll Crushers	1	13
e. Shredders	1	d. Product Size
1-4 Component Description	2	13
1-5 Crusher Applications	2	e. Product Removal
		13
SECTION II — INSTALLATION		
2-1 Receiving Instructions	3	
2-2 Storage Procedures		
a. Short-term, Less than twelve (12) weeks	3	SECTION IV — MAINTENANCE
b. Long-Term, twelve (12) weeks to twelve (12) months	3, 4	4-1 Maintenance
c. Storage in excess of twelve (12) months	4	14
d. Storage of Electrical Equipment	4	a. Daily Inspection
2-3 Pre-Installation Procedures		14
a. Short-Term, Less than twelve (12) weeks	4	b. Weekly (40 to 60 hours) Inspection
b. Long-Term, More than twelve (12) weeks	4	14
2-4 Installation		c. Monthly (160 to 240 hours) Inspection
a. General	4	14
b. Foundations	5	d. Thirteen (13) weeks (520 to 880 hours) Inspection
c. Leveling	5	15
d. Installing Circulating Oil and Hydraulic Systems	6	e. Twenty-Six (26) Weeks (1040 to 1560 hours) Inspection
e. Drive Installation	6	15
f. Installing V-Belts	6, 7	4-2 Maintenance Log
g. Bearings Temperature Indicating Device	7	15, 16
h. Electrical	7	4-3 Trouble Shooting
i. Installing Flexible Couplings	7, 8	17, 18
2-5 Lubrication		4-4 Repairs
a. General	8	a. Safety Precautions
b. Oil Lubrication	8, 9	19
c. Grease Lubrication	9, 10	b. Threaded Fasteners
		19, 20
		c. V-Belt Drive Maintenance
		20
		d. Balancing
		20-22
		e. Welding
		22, 23
		f. Bearings
		23-28
		4-5 Replacement Parts
		28
SECTION III — OPERATION		
3-1 Pre-Operation Checks	11	ILLUSTRATIONS
3-2 Safety	11	Figure 1 Rotor Handling Instructions
3-3 Start-up	11, 12	3
3-4 General Operating Instructions		Figure 2 Rotor Shaft Leveling
a. Material Feed	12	5
		Figure 3 Leveling Lower Housing
		5
		Figure 4 Drive Belt Sheave Alignment
		6
		Figure 5 Drive Belt Tensioning
		7
		Figure 6 Typical Hammer Distribution for Rotors having three rows of hammers
		21
		Figure 7 Typical Hammer Distribution for Rotors having four rows of hammers
		21
		Figure 8 Typical Hammer Distribution for Rotors having six rows of hammers
		21
		Figure 9 Typical Bearing Locking Devices
		24
		Figure 10 Heating Cylindrical Bore Bearings
		24
		Figure 11 Hydraulic Mounting of Taper Bore Bearings ..
		27
TABLES		
Table 1 Flexible Coupling Data	8	
Table 2 Tightening Torques Threaded Fasteners	19	
Table 3 Maximum Vibration Limits	22	
Table 4 Taper Roller Bearing Data	26	

SECTION I — GENERAL

1-1 Introduction:

The sections of this manual have been written to provide information in receiving, inspecting, installing, start-up, operating and maintaining your Jeffrey crusher. It is important to read carefully this manual before receiving your crusher, to have a thorough understanding of the equipment and its operation. Do not hesitate to contact your local Jeffrey Representative or the home office to answer any questions you may have or provide additional special instructions your particular application may require.

CAUTION

Failure to follow the instructions and procedures outlined in this manual could void your Warranty.

The INSTALLATION section contains pertinent information on what to do when you first receive your crusher. Of particular importance is the handling of the rotor and bearings and subsequent storage instructions. Many problems and start-up delays can be avoided with proper receiving and storage precautions.

Prior to installing your crusher, the installation and lubrication instructions must be read thoroughly. Important topics here include adequate foundations and proper lubrication of your crusher.

The remaining sections present valuable information on operating and maintaining your crusher for many years of reliable service and production of a suitable product for sustained profits. Reading and following the safety information contained in Section III is essential.

1-2 Crushing Methods:

Crushing refers to the physical reduction in size of any given material. Basically there are five (5) ways to reduce a material — by impact, attrition, shearing, compression, and tumbling. Most crushers use a combination of crushing methods. Jeffrey crushers employ one or more of the first four crushing methods.

Impact, as used in crushing terminology, refers to the sharp, instantaneous impingement of one moving object against another.

Attrition is the term applied to the reduction of material by a rubbing action between two surfaces and is primarily a grinding action.

Shear crushing is accomplished by a trimming or cleaving action rather than the rubbing action associated with attrition.

Compression, as the name implies, is accomplished by squeezing the material between two surfaces. The compression work may be done by either or both crushing surfaces.

There are three (3) major categories of crushers. These are

primary crushers, intermediate or secondary crushers and fine (tertiary, quaternary, etc.) crushers. Crushers are used for the initial reduction of run-of-mine (ROM) or run-of-quarry (ROQ) material down to a product size ranging from eight inches to one inch in size. Intermediate crushers obtain further reductions of already crushed materials, down to very fine piece sizes.

1-3 Jeffrey Crusher Types:

a. Primary Impactor — Rockbuster and Coalbuster

The Rockbuster (Coalbuster) is composed primarily of a heavy rotor with fixed impeller bars and a series of adjustable breaker bars. The material is fed through the opening over a hydraulically operated feed plate into the path of the rotor and is broken through the initial impact. Further reduction occurs with impact of material on material and impact of material on the breaker bars.

b. Primary — Roll Crushers

The roll crushers used in primary applications are Jeffrey heavy duty double roll crushers. Jeffrey roll crushers utilize massive rolls with heavy teeth enclosed in extra thick steel housings.

Large lumps of material are broken by impact of the heavy teeth striking the projecting parts of these large lumps in contact with the roll surfaces. Smaller lumps in the convergence zone between the rolls are sheared by the teeth and then compressed between the crushing surfaces.

The intermediate crusher group includes the following:

c. Secondary — Hammermills

The Hammermill consists of a series of either swing or rigid hammers and usually includes screen bars for final product sizing. The material is initially reduced in the upper chamber by impact, is further reduced by shear as it passes the breaker bar, and is finally reduced by attrition as the hammers force the material over and through the screen bars.

d. Secondary — Roll Crushers

This category incorporates both the single roll and double roll units. The single roll crusher has one roll rotating toward an adjustable breaker plate. The teeth first strike the feed with an impact and sledging action. Then they shear the material against the breaker plate as they move downward past the breaker plate.

Finally, they force the feed with pressure between the roll and the breaker plate obtaining reduction by compression.

The double roll crusher has two revolving rolls. One of the rolls revolves in fixed bearings while the other roll revolves in movable bearings held in place with heavy safety relief springs. The action is similar to that in the single roll with the additional feature of two rolls tending to pull the material down toward the center for further reduction due to compression.

e. Shredders

Jeffrey shredders are used in both primary and intermediate category applications. They are primarily hammermill type with special hammers and rotors designed to reduce material by shear due to the cutting and shredding action of the hammers on such materials as wood, rubber and other fibrous materials.

1-4 Component Description:

Jeffrey crushers consist of the rotor(s), with shaft(s) and hammers (if applicable), bearings with lubrication system, housing with liners, and drive. Detailed description for a particular type crusher, with identifying figures, appear in the Specific Instruction Manual.

It is important that installation and operating personnel become familiar with the terminology associated with crusher parts. A complete description of the crusher parts, including Jeffrey catalog numbers, is found on the Parts List Drawing supplied with each order. The Parts List Drawing is mailed separately when the crusher is shipped from our factory. Information as to recommended spare parts and instructions for ordering parts are contained in the Specific Instruction Manual for your particular type crusher.

1-5 Crusher Applications:

Your crusher was ordered and manufactured for a specific application. While Jeffrey crushers are versatile and have been applied to the reduction of a variety of materials producing various sizes of products, the adjustments, construction materials, design and fabrication of your crusher have been determined for a specific application. Should there be any question as to the intended service or last minute changes in application, contact your Jeffrey Representative.

CAUTION

The use or misuse of the crusher for service exceeding the prescribed service requirements may void your Warranty.

SECTION II — INSTALLATION

2-1 Receiving Instructions:

Where possible, your crusher has been shipped as a complete assembly. However, due to size and weight limitations, large crushers will be shipped in two or more subassemblies. Carefully inspect your crusher assembly(s) upon receipt of shipment for any damage or missing parts. Report any damage immediately to the carrier. Also contact our Woodruff Service Department, which can assist you in appraising the damages or loss and instruct you in required repairs or replacement so that your warranty remains valid.

When handling the crusher during unloading and erection, care should be taken to avoid damage by dropping or improper use of slings. Small, completely assembled crushers should be rigged with the slings around, under or laced through the heavy support members of the lower main frame. Never sling from the bearing housings or shaft. Large crushers will be shipped in two (2) or more subassemblies and the same care for handling these should be taken.

Special care is required when handling rotor assemblies. These should be rigged with the slings inboard of the bearings and as close to the heavy rotor section as possible. Rotors of the disc type should be rigged with a spreader (see Figure 1) between the slings to prevent damage to the discs. Never lift a rotor from hammer pins, bearing housings, or the outboard ends of the shaft.

The surface finish on crusher shafting is critical and should be protected from gouges, dents and scratches when using a sling.

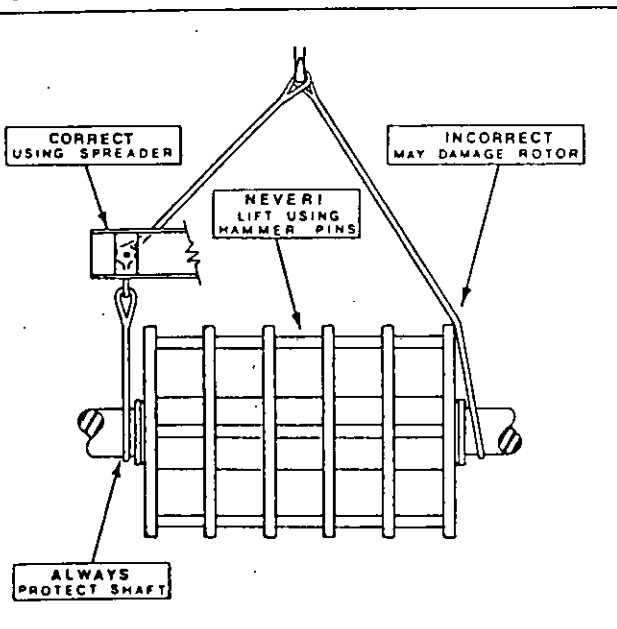


Figure 1 — Rotor Handling Instructions

2-2 Storage Procedures

The following detailed storage procedures are given to emphasize the importance of thorough protection for machinery

to survive long periods of idleness with a minimum of damage. Severe damage results in needless replacement parts and expensive delays in start-up.

a. Short-Term — Less than Twelve (12) Weeks

Before erection, for a period of less than twelve (12) weeks after unloading, the crusher and all auxiliary equipment should be stored on cribbing or suitable shoring to keep them free of dirt, mud and water and placed under cover.

Without protection, anti-friction bearings can be damaged beyond repair in one or two weeks. Moisture accumulation during storage, in the form of condensation inside the bearing housing, is a major cause of damage. Covering all bearings with waterproof canvas or plastic sheet will give protection against the weather but will not eliminate the effect of humidity. Only storage in a dry, heated area will fully protect against rust damage in a humid environment. Turn the rotor shaft by hand every four (4) weeks and relubricate the bearings. If the crusher will not be operated for twelve (12) weeks, but before twelve (12) months after shipment, further precautions are required. (See Long-Term Protection.)

In addition, cover the feed opening of the crusher with canvas or plastic sheet to prevent dust, dirt and the elements from entering the crusher. Rain or snow could corrode interior parts; in crushers with hammers, the hammers could bind on their pins causing an unbalance in the rotor. These hammers must be lubricated with a light oil to free them on their pins.

b. Long-Term Protection — Twelve (12) Weeks to Twelve (12) Months

In addition to the short-term precautions, the following protection is required for long-term storage: The bearings on Jeffrey crushers are protected against rust for only twelve (12) weeks after shipment provided the bearings are protected from weather, dust and dirt. For longer storage periods of up to twelve (12) months, or long shutdown, the bearings need long-term protection. On new equipment, check your order to see if Jeffrey has provided long-term protection. If you have not ordered long-term protection, the following procedures must be followed:

1. Thoroughly clean the outside of the bearing housings and the area around them so dirt will not drop or be blown into the open bearings. Remove the bearing cap and all the lubricant. Thoroughly clean and flush all internal surfaces of the bearing and housing with a petroleum solvent to remove all traces of dirt and sludge. Allow the solvent to drain from the bearing and housing. Removal of the lower half of the housing will make the work easier. If the lower half is not removed, the shaft must be raised enough to allow the outer ring to be rotated. Melt a preservative ("Rust Veto Heavy" or equal) by placing the estimated quantity that will be required in a container. Then, as with a double boiler, place this in a larger container of water. Slowly heat the water until all of the preservative is melted and has reached a temperature of 150-170F (66-77C).

WARNING

Melted preservative may burn in direct contact with skin. To prevent injury, use extreme caution when working with this or similar melted materials.

2. Immediately after cleaning, thoroughly coat all the outside surfaces and cavities of the bearing with melted preservative. Work the preservative between and around all of the rollers. Hand rotate the bearing to help distribute the preservative and to assure complete coverage of the interior surfaces. (A long spout, pump type oil can or a similar dispenser can be used for interior surfaces.)

3. Coat all surfaces of the locking assembly, shafting, ring seals and interior surfaces of the housing, the split between base and cap, etc. with "Rust Veto Concentrate" or equal. Remove the oil sight gauge, if used, and plug the connection in the housing. Reassemble the pillow block. (If an external lubricating system is used, disconnect and plug all feed and return line connections to the housing.) After reassembly is complete, seal around each shaft at the housing with preservative.

4. If the unit is outside, the housings must be protected from the weather by covering with plastic sheet or waterproof canvas. (Storage in a dry, heated area is preferred.)

c. Storage In Excess of Twelve (12) Months

In the event the crusher is stored or out of service for more than twelve (12) months, repeat the above procedure. For extremely long periods of inactivity, new parts may be required to put the crusher back in service. In these situations, the advice of a Jeffrey Sales or Service Representative may be helpful.

Equipment that has been erected and is not in operation will require the same protection.

Exposed finished surfaces on parts like bearing seats, shafting, etc. should be coated with a heavy grease or other protective material and covered for protection from weather. (Clean all finished surfaces before start-up.)

Lubrication and hydraulic systems, cylinders, air and hydraulic tubing, etc. require protection from dirt and grit as well as moisture and should be given as much protection as possible. Dry, clean, inside storage is recommended.

d. Storage Of Electrical Equipment

Electrical controls and motors, like bearings, are very susceptible to permanent moisture damage and should be protected. Unlike a bearing, the moisture damage cannot be seen in most cases. A clean, warm, dry area is the best protection.

Push-button control stations, junction boxes, small to medium horsepower motors, etc., if located outside, should be weather-proof by design, and additional weather protective coverings usually are not required, but will, of course, provide additional protection.

For detailed protection instructions, read the manufacturer's instruction sheets, which are included in your Parts Catalog.

2-3 Pre-Installation Procedures:

a. Short-Term — Less Than Twelve (12) Weeks

1. Remove protective covering if stored outside.
2. Remove protective coating from shafts and exposed finished surfaces.
3. Reread handling procedures to insure that equipment is not damaged during installation.
4. For Oil Lubricated Bearings only, drain run-in oil from Bearings. Then flush and clean bearings with a non corrosive petroleum solvent. Replace run-in oil with proper lubricant (see LUBRICATION section).

CAUTION

The following procedure assumes the crusher will be put in operation at time of installation. If start-up is to be delayed beyond twelve weeks do not remove bearing protection.

b. Long-Term Storage — More Than Twelve (12) Weeks

1. Remove protective covering if stored outside.
2. Clean any dust and dirt from the bearing housings and surrounding area.
3. Clean and flush the preservative from the bearings. This is accomplished by using a noncorrosive petroleum solvent heated to 100-120F (38-49C).

CAUTION

Be absolutely sure all lubrication grooves and ports in the outer ring of the bearings and all openings in the housings are clean and free from any foreign materials. In most cases the bearing housing will have to be disassembled to insure thorough cleaning.

4. Replace preservative with proper lubricant (see LUBRICATION section).

2-4 Installation

a. General

No attempt will be made in this manual to cover all aspects and procedures required for proper erection of crushing equipment and related support machinery. Jeffrey equipment requires mechanically sound erection procedures to be used during the installation of our machinery. The following are general instructions and procedures which, in addition to the above, Jeffrey considers essential for proper erection and operation. If there are any questions or additional instructions required, please contact your Jeffrey Representative and always refer to the serial number of your crusher.

b. Foundations

The foundation structure for all mechanical equipment, and especially for crushers, should be as level and as dimensionally accurate as possible and structurally capable of supporting the developed loads. The type of structure and the design of footings are determined by plant procedures and local soil conditions.

The foundation must be designed to carry one (1) x machine weight as a static load and (1.5) x machine weight as a dynamic load.

These two loads added together equal the foundation load in the vertical plane. Foundation design requires the capability of carrying one (1) x machine weight load in the horizontal plane. In addition, the natural frequency of the foundation structure is to be at least twice the operating frequency of the crusher.

CAUTION

Use only certified crusher assembly drawings furnished by Jeffrey for foundation design.

To compensate for any inaccuracy of the foundation or support plates of the equipment, the use of grout and shims is recommended to assure proper contact between the support plate and foundation and to facilitate leveling.

The area contact between the support plate of a crusher and foundation is more critical than other types of equipment due to the magnitude of the dynamic loads that can be developed. The contact area should be evenly distributed over the entire support plate with no large gaps. The support plate area directly under the bearings should have 100% contact.

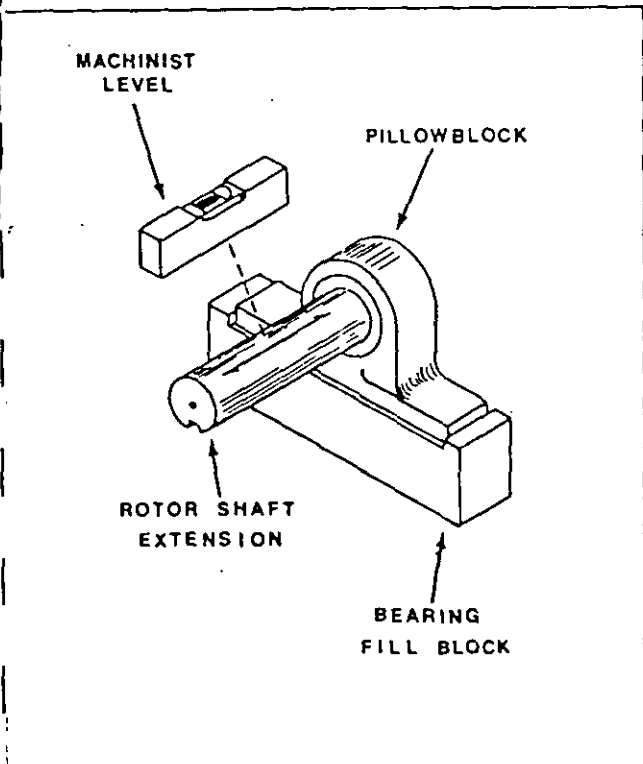


Figure 2 — Rotor Shaft Leveling

Auxiliary equipment supports and erection should be given the same care as that required for the crusher. Alignment between rigidly connected units must be maintained along with proper foundation connections.

c. Leveling

The horizontal centerline of the rotor shaft should be level. This will eliminate a possible side thrust load on the bearings. A thrust load of any magnitude continually applied can cause premature bearing failure.

Small crushers are normally installed as one unit and the rotor will be factory assembled in the crusher and the bearing mounting bolts properly torqued.

With a machinist's level on top of the shaft, level the rotor with shims and then grout between the support plate and the foundation. The crusher housing need not be level when the rotor is level.

CAUTION

Do not try to level the housing parallel with the shaft (see Figure 2).

After the rotor is level, the crusher housing should be leveled perpendicularly to the shaft. For larger units, the lower housing can be leveled from the bearing fill blocks or directly on the bearing pedestal (see Figure 3). During the leveling operation, alignment with other auxiliary equipment must be maintained. It is suggested that each unit be set, leveled and aligned, but not permanently grouted and anchored until all equipment is in place and final adjustments have been made.

The recommended torque values for various bolts are found in Table 2 in the THREADED FASTENERS section under MAINTENANCE.

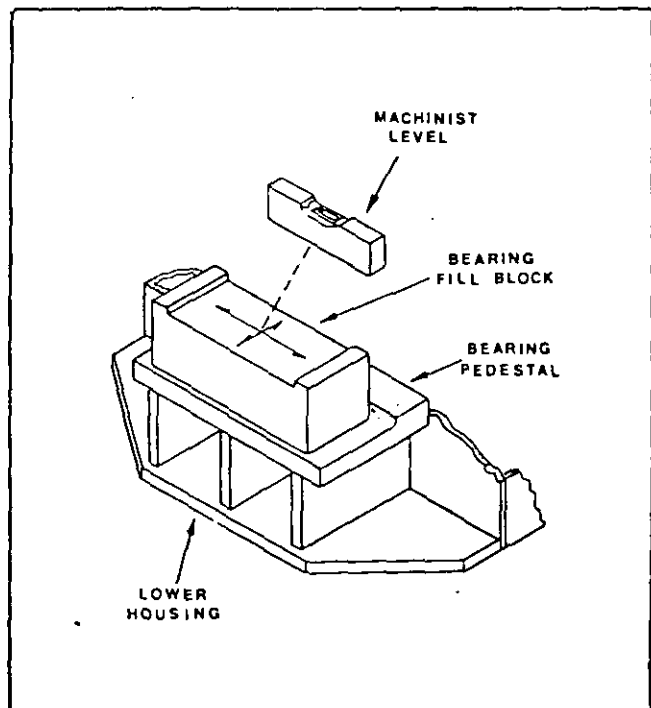


Figure 3 — Leveling Lower Housing

Step #3: Compare the force required in Step #2 with the values given in the belt manufacturer's specifications. The force required should be within the minimum and maximum values given. A new set of belts should be initially tensioned until the deflection force is higher than the maximum recommended force because the tension will decrease during the V-belt run-in period. This greater run-in belt tension is determined from the V-belt manufacturer's specifications.

Ultimately, due to variations in belt composition, duty cycle, and other factors, the only accurate check of belt tension is during operation under load. Checks for proper tension are given below:

See that while running there is a slight bow in the slack side when operating at full load. During peak load conditions, this bow will increase slightly, thus the amount of slack will represent the degree of load on the drive system.

Listen to the belts on initial start-up. If they squeal, stop the drive and increase the center distance to get more tension.

Touch the groove on a sheave, only after locking out the drive so that it cannot be restarted, to see if the sheave is hot. If you cannot hold your finger in the groove, the belts are running too hot and, provided the heat is not from some external source, the V-belt tension should be increased.

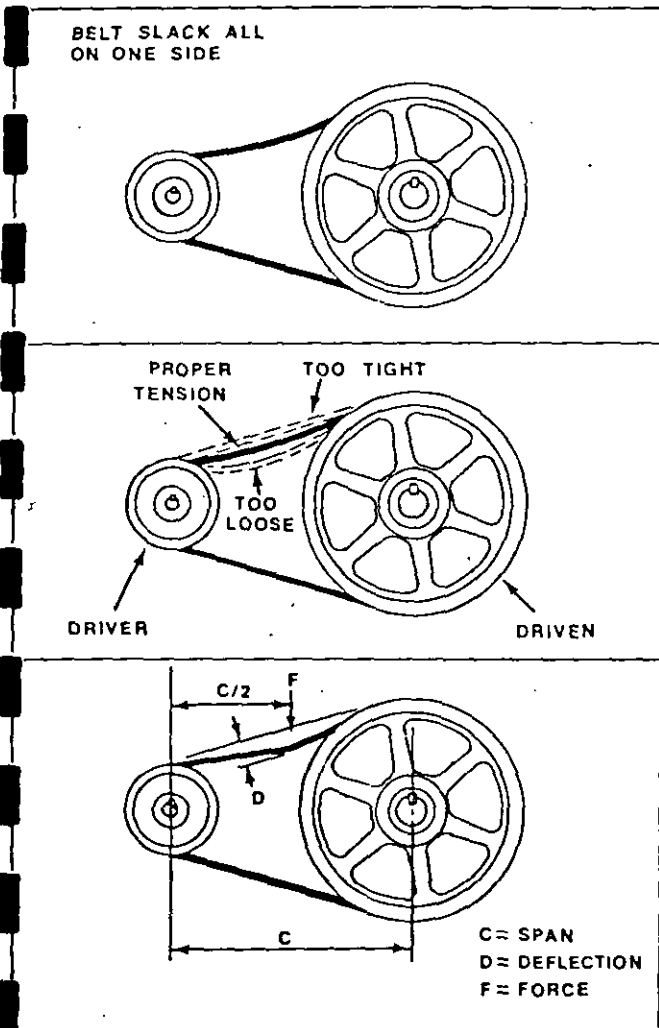


Figure 5 — Drive Belt Tensioning

g. Bearing Temperature Indicating Device:

Crusher bearings that are to be equipped with thermistor probes will not have the probes or the mounting heads assembled to the bearing housing when shipped. The installation of this device is simple. If your unit is so equipped, full instructions and sketches will appear in the *Specific Instruction Manual for your type crusher*.

h. Electrical:

Jeffrey typically does not provide electrical controls nor do we recommend specific manufacturers' control systems. However, on special applications where Jeffrey does furnish the controls, wiring diagrams and instructions will be supplied.

In either case, proper wire sizes and ground protection must be provided according to applicable local and national codes. Installation should be performed by qualified and certified electricians.

i. Installing Flexible Couplings:

Crushers that operate on a one-to-one speed ratio with the drive motor use a flexible coupling to transmit torque. The following instructions apply to sizes 60T thru 140T Falk Steelflex Tapered Grid Couplings. For other types, consult manufacturers' instruction manuals. Only standard mechanics tools, wrenches, a straight edge and feeler gages are required to install Falk Steelflex couplings. Falk Couplings sizes 60 thru 90 are furnished for CLEARANCE FIT with set screws. Sizes 100 and larger are furnished for an INTERFERENCE FIT without set screws. Heat hubs with interference fit in an oil bath to a maximum of 275F (135C) to mount. The oil flashpoint must be 350F (177C) or higher.

WARNING

Lock out the starting switch of the crusher drive motor.

1. Mount Seals and Hubs — Clean all metal parts using a nonflammable solvent. Lightly coat seals with grease and place on the shafts BEFORE mounting hubs. Mount heated hubs on their respective shafts so the hub face is flush with the end of its shaft. Tighten the set screws.

WARNING

Use care in handling heated hubs to avoid injury due to burns.

2. Gap and Angular Alignment — Use a spacer bar equal in thickness to the normal gap specified in Table 1, page 8. Insert the spacer bar to the same depth at 90 degree intervals around the hub and measure the clearance between the bar and the hub face with feeler gages. The difference in minimum and maximum measurements must not exceed the ANGULAR limit specified in Table 1.

TABLE 1

COUPLING SIZE	GAP — IN (MM)			ALIGNMENT LIMITS-IN (MM)		COVER BOLT TORQUE IN-LBS. (NEWTON-M)	MAX SPEED RPM
	MIN	NORMAL	MAX	OFFSET (MAX)	ANGULAR (MAX)		
60T	.062(1.59)	.125(3.17)	.188(4.77)	.010(.254)	.010(.254)	200(22.6)	4350
70T	.062(1.59)	.125(3.17)	.188(4.77)	.010(.254)	.010(.254)	200(22.6)	4125
80T	.062(1.59)	.125(3.17)	.250(6.35)	.010(.254)	.010(.254)	200(22.6)	3600
90T	.062(1.59)	.125(3.17)	.250(6.35)	.012(.305)	.012(.305)	200(22.6)	3600
100T	.062(1.59)	.188(4.77)	.375(9.52)	.012(.305)	.012(.305)	260(29.4)	2440
110T	.062(1.59)	.188(4.77)	.375(9.52)	.012(.305)	.012(.305)	260(29.4)	2250
120T	.062(1.59)	.250(6.35)	.500(12.7)	.012(.305)	.012(.305)	650(73.4)	2025
130T	.062(1.59)	.250(6.35)	.500(12.7)	.012(.305)	.012(.305)	650(73.4)	1800
140T	.062(1.59)	.250(6.35)	.500(12.7)	.015(.381)	.015(.381)	650(73.4)	1650

3. Offset Alignment — Align the motor shaft with hub so that a straight edge rests squarely (or within the limits specified in Table 1) on both hubs at 90 degree increments around the hubs. Check this alignment with a feeler gage. The clearance must not exceed the OFFSET limit specified in Table 1. Tighten all motor mounting bolts and repeat steps 2 and 3. Realign the coupling if necessary. Note: Use a dial indicator for more accurate alignment measurements.

4. Insert Grid — Before inserting the coupling grid, pack the gap between the hub faces and the grooves of the hubs with grease recommended in the LUBRICATION section. When grids are furnished in two or more sections, install them so that all cut ends extend in the same direction; this will permit cover installation. Spread the grid slightly to pass it over the coupling teeth and set the grid(s) with a soft mallet.

5. Pack with Grease and Assemble Covers — Pack the spaces between and around the grid with as much grease as possible and wipe off excess flush with the top of the grid. Position the seals on the hubs to line up with grooves in the cover. Position the gaskets on the flange of the lower cover half and assemble the covers so that the match marks are on the same side. Secure the cover halves with fasteners and tighten to the torque specified in Table 1.

CAUTION

Make certain the lubrication plugs are installed in their holes before operating.

6. Periodic Lubrication — Remove both lubrication hole plugs and insert grease fitting. Fill with the recommended or equivalent lubricant until an excess appears at the opposite lubrication hole.

CAUTION

Make certain all lubrication hole plugs have been installed after lubricating.

7. Coupling Disassembly and Grid Removal — When it is necessary to disconnect the coupling, remove the cover halves and grid. A round rod or screwdriver that will conveniently fit into the open loop ends of the grid is required. Begin at the open end of the grid section and insert the rod or screwdriver into the loop ends. Use the teeth adjacent to each loop as a fulcrum and pry the grid out radially in even, gradual stages, proceeding alternately from side to side.

2-5 Lubrication

a. General

The lubricating medium is the lifeblood for equipment with rotating parts. A lubricant of improper type or quantity can damage bearings and rotating members.

Jeffrey lubricant specifications represent high quality products and are, of necessity, general in nature. Unusual variations in environment will make some performance specifications more important than others. Lubricant suppliers can furnish performance test data for their products which will correlate with the specifications given in this manual. We suggest that you obtain this test data from your suppliers so that you may judge the quality of their products in an objective manner.

There is no intention to influence the purchase of lubricants from any one supplier. The trade names listed are for those products which their respective manufacturers have recommended to Jeffrey to meet Jeffrey's specifications concerning performance requirements. Lubricant specifications are listed here as a convenience to users of Jeffrey equipment. For additional details and other lubricant recommendations, refer to Jeffrey Machinery Lubricants Bulletin #1147.

b. Oil Lubrication

1. General: The oil lubrication of bearings falls into one of two general groups. The most commonly used is the static type, with a sump or reservoir of oil in the housing in which

the bearing rotates. The other type is the circulating system where oil is pumped into the top of the housing, allowed to flow down through the bearing, and is drained from the lower portion of the housing and returned to an oil reservoir tank.

Bearing size, operating speed and temperature, induced loading, and possible contamination are some of the factors that determine the type of oil lubrication used (static or circulating).

In the normal environment surrounding a crusher installation, contamination of the oil from an external source is a MUCH GREATER problem than oil deterioration. Therefore, the time interval necessary for flushing and replacement is more dependent upon environmental conditions of the installations than the expected lubricating life of the oil.

Therefore, the cost for flushing and relubricating a bearing is small when compared to the long downtime that may be required, plus the actual replacement cost of the bearing, if you encounter a failure. The schedules given below have been established as a guide for flushing oil-lubricated bearings and lubrication systems. These schedules are based on anticipated contamination rather than oil life.

2. Static Oil: Static lubrication requires a given level of oil in the housing. Each housing is equipped with a sight gage and the required level for that bearing is indicated by notches in the gage and/or a scribed line on the glass. ALWAYS check the oil level with the bearing at rest and all oil drained back into the sump. Make-up oil should be added only while the bearings are at rest. During operation, the actual or visual oil level will be somewhat below the gage markings (this is normal).

Static Oil Lubrication Schedule:

- After first 32 hours of operation—drain and flush.
- After every 240 hours of operation—drain and flush.
- After every 480 hours—drain, open housing, clean and flush.

3. Circulating Oil: A Jeffrey crusher utilizing a circulating oil system will maintain the required oil level and/or flow for complete bearing lubrication and cooling as long as the oil system is properly adjusted and operating correctly, and as long as a sufficient oil level is maintained in the reservoir.

The oil reservoir of the circulating oil system should be filled to the level indicated by the sight gage located on the oil tank and should be checked daily. Any make-up oil should be added with the system at rest. During operation, the oil level will fall somewhat below the gage marking. As in Static Lubrication, this is normal.

Circulating Oil Lubrication Schedule:

- After first 48 hours of operation—change filter.
- After every 240 hours of operation—change filter.
- After every 480 hours of operation—drain and flush.
- After every 720 hours of operation—drain, open and clean and flush bearing and system tank.

Make-up oil should be added to the system as required.



The above schedules are for normal installations. Abnormal conditions such as elevated ambient temperatures, severe dirt and dust, high humidity or chemical fumes and vapors may necessitate more frequent lubrication checks.

4. Oil Specifications:

Jeffrey Lubricant No. 73-A—Bearing Lubricant:

This lubricant should be a turbine quality mineral oil which may be used for either static or circulating oil systems. A minimum viscosity of 100 SSU (21 mm²/s) must be maintained at the bearing operating temperature. For winter use, or cold starting temperatures, it is recommended that a similar quality lubricant can be used having a pour point of at least 20F (11C) below the cold start temperature. The following specifications have been approved by the bearing manufacturer for lubricants in specific applications:

ASTM Viscosity Grade NoS1000 (C220)
AGMA Lubricant No5
Viscosity Range	
at 100F (38C) 918-1122 SSU (202-247 mm ² /s)
Viscosity (ASTM D-88)	
at 100F (38C) 900 SSU (198 mm ² /s) minimum
at 210F (99C) 75 SSU (14.4 mm ² /s) minimum
Viscosity Index60 minimum

Below is a list of a few typical products that meet the suggested specifications:

GULF HARMONY 220	SHELL TELLUS 71
TEXACO REGAL R&O 220	ARCO DURO S-1000
TEXACO REGAL R&O 320	CHEVRON OC TURBINE OIL 220
MOBIL DTE BB	EXXON NUTO 93

c. Grease Lubrication

1. General: On Jeffrey crushers operating at relatively slow speeds, grease lubrication of the anti-friction bearings is used. Roller bearing greases are usually a mixture of lubricating oil and a soap base. The latter merely acts to keep the oil in suspension. As the bearing rotates through the grease, a small amount of oil adheres to the bearing surfaces. Oil is removed from the grease near the rotating parts. The oil picked up by the bearing is gradually broken down by oxidation or lost by evaporation and centrifugal force. Bleeding of the grease should therefore take place so as to continue to supply a small quantity of oil, which is usually sufficient for satisfactory operation.

The actual temperature of the bearing while running is the most critical factor to be considered in choosing a particular grease. Also grease life is considerably affected by such factors as speed, load, humidity, type of service and frequency of lubrication. The choice of lubricant must take these factors into account. For unusual operating conditions, consult a competent lubrication engineer for recommendations.

The bearings on Jeffrey crushers are properly greased if the level of grease is maintained at 1/3 to 1/2 of the capacity of the bearing and housing space. Any greater amount can cause overheating. Some Jeffrey crushers are equipped with sleeve bearings. Sleeve bearings may or may not utilize a dispensing device that will inject a small amount of grease into the bearing at a predetermined rate and time interval. If there is any doubt as to the amount of grease in a bearing, a safe rule is to add grease slowly as the bearing operates until the first sign of grease appears at either seal.

2. Greasing Intervals: Determination of the regreasing interval depends on a number of operating factors. The quantity of grease remaining is not a measure of the time interval between regreasing. Only the grease which is immediately adjacent to and in contact with the bearing takes part in the lubrication. The grease in this location may gradually cease to lubricate due to the depletion of the oil, leaving just the soap base, whereas the grease further removed from the bearing may still be in good condition. The kind of grease used and the operating speeds are important factors to be considered. An accurate prediction of the time the grease will last under certain conditions cannot be made. In applications where elevated temperature, high speed, severe contamination, high humidity or other extreme conditions are encountered, particularly with open type bearings, accelerated deterioration of the grease will take place. Under these conditions, periodic inspection during the first few weeks of operation will provide the best determination of the required frequency of regreasing.

Regardless of the uncertainties involved, it is still of value to have an approximate idea when a small amount of grease should be added. The following is given as a lubrication guide:

- After every 60 hours—add small amount of grease.
- After every 580 hours—open and inspect—clean and flush if required.
- After every 960 hours—open and inspect—clean and flush.

The above schedule does not represent the time grease will last. It should be understood that the time given is the time after which it is advisable to take the suggested action in order to safeguard grease or oil lubricated bearings on and around crusher units.

3. Grease Specifications:

Jeffrey Lubricant No. 81—EP Multi-Purpose Grease:

A highly stable multi-purpose EP grease suitable for anti-friction bearing lubrication at temperatures from -5 to +250F (-21 to +121C) and meeting the following specifications:

NLGI Grade No	2
Worked Penetration (ASTM D-217) at 60 Strokes ...	265-295
Maximum Change 60 to 10,000 Strokes	10%
Timken Test Load (ASTM D-2509) at 400 rpm	40 lbs.
Minimum Dropping Point (ASTM D-556)	350F (177C)
Oil Viscosity (ASTM D-88) at	
100F (38C)	700-1000 SSU (154-220 mm ² /s)
Oxidation (ASTM D-942) Maximum psi	
Drop Per 100 hrs	5 (34.5kPa)
Copper Corrosion (ASTM D-1261)	
24. hrs. at 212F (100C)	Pass
Wheel Bearing Test (ASTM D-1263)	
Maximum Loss at 220F (104C)	5%
Water Washout Test (ASTM D-2164)	
Maximum Loss at 100F (38C)	5%
at 175F (79C)	15%
Soap Base	Lithium

Below is a list of typical products recommended to meet the above specifications:

- Shell Alvania EP #2 or #3
- Mobilux EP #2
- Gulfcrown Grease EP #2

SECTION III — OPERATION

3-1 Pre-Operation Checks:

Troublefree operation depends on proper installation and maintenance. While this seems obvious, many of our service calls are a result of improper installation or inadequate maintenance. Therefore, before putting the crusher into operation, take time for the following pre-operation checks. You may want to design a check list form to be filled out and signed by the operator each time the crusher is started. Any items that do not check out should be noted and the maintenance department contacted immediately for repairs before crusher is operated. This list may be modified to include auxiliary equipment unique to your installation. Some suggested checks are:

- a. Check the bearing lubrication system for proper levels of oil or amount of grease in each bearing.
- b. Check rotor rotation against the rotation label on the crusher side frame. (For initial start-up or after motor repairs.)
- c. Check inside the crusher for tools or any debris that may have been left inside during installation or maintenance work.

WARNING

Do not open crusher or attempt to reach inside unless the crusher drive motor disconnect switch has been locked out and the rotor has come to a complete stop.

- d. Tightness of crusher mounting bolts and other mechanical fasteners associated with the crusher and its drive equipment.
- e. V-belt tension should be checked now and during initial start-up.
- f. Feed and discharge equipment are properly installed and operating satisfactorily.
- g. Check to see that all machine guards and/or protective devices are installed. If there is any question as to machine safety equipment, it should be brought up now, prior to operation.
- h. Verify that the correct voltage, frequency and phase of the supply power to the motor corresponds to that which is indicated on the crusher drive motor nameplate.

3-2 Safety:

It is important to follow rigorous safety procedures when operating crushing machinery. Jeffrey has necessarily designed this equipment of a rugged nature to withstand the abuse mechanical parts undergo during operation. This equipment can, if proper safety precautions are not observed, cause serious injury or death. The following are a few of the safety rules suggested to form the basis of a safety program. This list may not be complete. Thus, applicable local or federal safety codes and individual plant safety rules and regulations may alter or add to the following list:

- a. Never perform any maintenance on the crusher or its drive equipment without first locking out the drive motor disconnect and allowing the rotor to come to a complete stop. Never operate the crusher without checking to be absolutely sure all personnel are clear of the machine and its drive.
- b. Never operate the crusher without guards and other safety devices in place. It is the customer's responsibility to provide and keep in place all shrouds and/or similar safety devices. In particular, shrouds should be provided in the areas of the feed opening to prevent material fly-back from injuring personnel standing near the opening.
- c. Personnel in the vicinity of the crusher while it is in operation must wear hard hats, safety goggles and any other safety equipment that may be required.
- d. Never install belts on pulleys by rotating the crusher shaft.
- e. Only persons authorized by their supervisor and experienced in operating the crusher or similar equipment should be allowed to operate the crusher. Also, maintenance personnel must be competent and experienced with crushing equipment.
- f. All feed equipment must be interlocked with the crusher so that it cannot be operated when the crusher is not operating. If feed equipment is not interlocked, any operating or maintenance personnel must lock out this feed equipment, in addition to the crusher, before performing any work on the crusher.
- g. Do not attempt to operate the crusher at any speed other than that for which it was originally designed, without consulting Jeffrey. Speeds in excess of design speed can cause component failure, resulting in injury or death to operating personnel.
- h. Do not feed materials into the crusher other than those for which the crusher was originally applied or designed. Alternate materials could cause premature component failure due to overload or excessive wear. Such an untimely failure could result in injury or death to operating personnel.

3-3 Start-up:

Prior to start-up, make a last minute check to see that loose parts, such as tools, rigging, covers, excess hardware, nuts, and bolts have been picked up and safely stored.

All personnel not involved with operating the crusher should vacate the area. Only qualified personnel experienced in operating industrial equipment of this type should be allowed to operate the crusher.

Be certain that the pre-operation checks have been made and any corrections or alterations have been completed.

When starting the crusher, keep the material feed shut off. Run the crusher with no load, listening for any unusual sounds. Investigate and correct any unusual noise or vibration before allowing material to enter the crusher. Also monitor the bearing temperature, checking for overheating. Any cause of overheating must be corrected immediately.

opposite to... rotation will increase the rejection or flyback of the material by the crushing members. Feeding from either side of the crusher will not allow proper distribution of the material across the width of the rotor.

The direction of rotor rotation for a crusher is fixed by design and cannot be changed except for our reversible units. Improper rotation can result in component damage.

CAUTION

NEVER operate a crusher in the wrong direction. Each machine has rotation labels to indicate proper rotor direction.

Rotor Speed:

The rotor speed for a crusher in revolutions per minute (RPM) will be predetermined for the material, feed size, and product size at the time of purchase (see your machine assembly drawing for proper speed). A change in the operating speed, with all other conditions unchanged, will result in one or more of the following:

1. An Increase In Speed:

(A) Could make the bearing lubrication system inadequate.

CAUTION

NEVER make a speed INCREASE of more than 25 RPM without contacting a Jeffrey Representative. YOU COULD SERIOUSLY DAMAGE THE BEARINGS.

- (B) Could make a finer product size.
- (C) Could change the effective capacity of the crusher.
- (D) Could increase the wear rate of internal parts.
- (E) Could decrease belt pull at the same horsepower.
- (F) Will decrease bearing life.
- (G) Could increase vibration.

2. A Decrease In Speed:

- (A) Could make a larger product size.
- (B) Could change effective capacity.
- (C) Could reduce the impact or cutting force of the crushing members.

- (D) Could increase belt pull at the same horsepower.
- (E) Will increase bearing life.

Speed is a critical function in the operation of crushing equipment. As indicated, a variation or change in speed alone will produce some very predictable results. However, if some other modification to the crusher is made at the same time as the speed change, the expected result could be altered in either direction or could be completely nullified. If speed, or any other change that could affect the operation of your crusher is contemplated, your Jeffrey Representative is available for advice and consultation.

CAUTION

Every crusher has a maximum speed above which it cannot be safely operated. Refer to the Specific Instruction Manual for your maximum speed.

d. Product Size:

Every Jeffrey crusher is equipped with one or more mechanical means, as well as speed, to vary the finished product size. With open discharge units, (Rockbusters, reversible impactors, Mud Hogs, etc.) product size can be controlled by moving breaker bars or breaker plates closer to or farther away from the crushing elements.

Hammermills are equipped with screen grates or perforated plates across the discharge area to size the product. Varying the opening in the grates or plates will change product size.

Double and single roll crushers utilize adjustable roll centers or breaker plates.

All Jeffrey crushers (except Rockbusters) can be varied as to the size, shape, number, and arrangement of hammers, teeth, or other crushing elements to produce the desired product size. These, along with the other adjustments discussed, make Jeffrey crushers very flexible as to product size produced.

e. Product Removal:

The material being processed by a crusher must at all times be removed at a rate at least equal to or greater than the discharge rate of the crusher. If material is allowed to build up in the discharge area, it can cause excessive wear to crushing members and could plug or stall the crusher.

It is strongly recommended that all takeaway equipment be electrically interlocked to STOP the feed to the crusher if a malfunction or failure should occur in the discharge system. If Jeffrey has supplied the discharge equipment, consult the Specific Instruction Manual.

SECTION IV — MAINTENANCE

4-1 Maintenance Schedule:

Maintenance is the most important aspect of the efficient and profitable operation of any industrial machine. Jeffrey crushers are no exception. In fact, due to the nature of materials reduction equipment, internal parts are constantly wearing at varying rates due to impact and abrasion. Variations in material, particle size, capacity, feed and discharge systems will require adjustment of the suggested maintenance schedule to suit your application. Also, the crusher environment will determine the frequency of performance of some maintenance items. Conditions such as rapid or extreme changes in temperature, excessive dust and dirt, high concentrations of corrosive fumes or vapors will necessitate more frequent maintenance.

The maintenance schedule proposed in this manual is for average conditions and moderate duty i.e., plants operating one shift per eight (8) hour day, 40 hours per week. For installations operating more or less than 40 hours per week, this suggested schedule should be adjusted accordingly.

We recommend that the maintenance schedule be written and posted in an appropriate location for operations and maintenance personnel. Completed and signed maintenance reports will form a valuable record for ordering replacement parts and scheduling repairs.

WARNING

Lock out main disconnect switch to crusher motor before performing inspection or maintenance operations.

a. Daily Inspection:

1. Inspect hammers (on hammermill type crushers) to see that they are free on their pins. Note wear on hammers and rebuild or replace as necessary. Hammers with cracks or ends broken require immediate replacement.

2. Visually inspect inside liners for wear and replace as required.

3. Retorque all bolts per the torque specification given in Table 2, page 19. Replace any broken bolts. After 50 hours running, this can be eliminated from the daily inspection and transferred to the four (4) week (160 to 240 hour) inspection.

4. Inspect the welds on the rotor, screen grates, etc. for cracks and spalling. Note the degree and location of damaged welds. Damaged welds must be repaired immediately and before putting the crusher back into operation (see WELDING section).

5. Clean dirt and debris from around bearing housings. Retorque bearing housing holddown bolts, if necessary.

6. On static oil bearing lubrication systems, check the oil level and refill if necessary.

7. For circulating oil lubrication and hydraulic systems, check for leaks. Also check the oil levels and replenish if necessary, noting the amount of fluid used as this may be an indication of a leak in the system. Also check the heat exchanger (if provided) for proper operation.

8. Check auxiliary equipment for proper adjustments and operation and make repairs as required.

9. During operation, check for unusual conditions that may arise, such as unusual noise, excessive vibration, improper feeding, or overheating of parts. Make notes of these conditions for the maintenance department.

b. Weekly (40 to 60 Hours) Inspection:

In addition to the checks outlined in the Daily Inspection section, the following items are to be checked:

1. Check for high wear points to be restored by hard-surfacing and rebuilding. Wear should not proceed beyond the point where the rebuilding cost is excessive or to the point at which the part is permanently damaged and must be replaced. For proper welding instructions, see the section on WELDING.

2. After the first 40 to 60 hours of running time, change all filters on lubrication and hydraulic systems. Thereafter, change filters every 160 to 240 hours.

3. On grease lubricated bearings, add a small amount of grease (see LUBRICATION section).

4. Check the lubrication and hydraulic lines for damage, repair all leaks and provide for protection of these lines.

5. Check the drive components for alignment, belt tension, wear or other damage and readjust or repair as required.

6. During the first 40 to 60 hours of operation, check the material flow through the crusher. Note any abnormal conditions and correct same (see section on MATERIAL FEED), such as uneven loading and material buildup.

7. Readjust or repair any items noted in daily inspections pertaining to the auxiliary equipment.

c. Monthly (160 to 240 Hours) Inspection:

In addition to the weekly inspections, make the following checks:

1. On static oil lubrication systems, drain oil from the bearing housings, flush if dirt or sludge is found, and refill with new oil (see LUBRICATION section).

2. On circulating oil systems, change the filters. Also check oil gage ports and air relief valves for proper operation.

3. Perform all welding and hard-surfacing to rebuild all hammers or impellers to their original shape.

4. Recheck all bolts for proper torque, especially the crusher anchor bolts. Retighten as required (see THREADED FASTENERS section).

5. Investigate and correct any unusual conditions noted on daily and weekly reports.

d. Thirteen (13) Weeks (520 to 880 Hours) Inspection:

1. Inspect and clean all equipment and repair or replace all worn or damaged parts.
2. Open bearing housing and thoroughly clean the bearings. Inspect bearings and housing interiors for signs of wear, noting any pitting or discoloration of the bearing faces. If damage is severe, the bearing and/or housing must be replaced. Recheck lubricant being used to be sure it conforms to specifications for your particular operating conditions. Check all seals and replace if worn or damaged. Reassemble housing and refill with fresh lubricant.
3. If the hammers (on hammermill type) have not been replaced, remove one row of hammers and check for wear in the pin hole. If the hammer pin holes show any sign of elongation or visible cracks appear, the hammers will become dangerously weak and must be replaced, as the area has been reduced due to this elongation, increasing the stress. Also inspect the hammer pin for wear and replace if worn.
4. Inspect the drive system. In particular, check the V-belts for cracks, fraying, opening at the seams and uneven stretch.
5. The flexible coupling should be regreased and its coupling guard bolts checked. Any worn or damaged parts must be replaced.
6. Inspect all guards, shields and other safety devices for damage. Repair or replace if required.

WARNING

A damaged or missing guard or a defective safety device can needlessly expose operating personnel to the danger of personal injury or death. The maintenance of these devices is extremely important.

e. Twenty-Six (26) Weeks (1040 to 1560 Hours) Inspection:

In addition to the thirteen week inspection, check the following items:

1. Remove all hammers (on hammermill type) and hammer pins and check the rotor balance (see BALANCING section). Replace all worn pins and rebalance if necessary.
2. Disassemble flexible couplings, remove grease and thoroughly clean all parts. Replace any worn parts. Relubricate the coupling and reassemble according to the coupling manufacturer's instructions, making sure the coupling is properly aligned.
3. Clean dust and dirt from control cabinets. Check for loose connections and damaged or deteriorating insulation.
4. Check motor manufacturer's instructions for possible relubrication of motor bearings. Be sure to follow the motor manufacturer's instructions as to type and amounts of lubricant. Note that overgreasing is a major cause of bearing and motor failure. Make sure dirt and contaminants are not introduced during relubrication.

The schedule given in preceding pages is based primarily on hammermill type crushers, but applies generally to all types. Specific instructions for your crusher are in the Specific Instruction Manual. The items given may not be all inclusive. Any items not covered should be added to the list and become a part of the maintenance routine. Remember, maintenance is a continuous process of planned inspection, repair and replacement of parts. Such a program will insure long life and a minimum of lost production due to equipment breakdown.

4-2 Maintenance Log:

To facilitate maintenance and insure timely repairs, it is strongly recommended that a maintenance log be kept on each crusher. A typical log sheet is on page 16. These reports should be kept and used as references when ordering replacement parts. They can also be used to calculate efficiencies and maintenance time for long term planning.

MAINTENANCE LOG

Crusher Serial No. _____ Material _____ Hammer Size _____ Inspected By _____
 Original Order No. _____ Particle Size _____ Screen Opng. _____
 Equipment No. _____ Tonnage _____ Lube System _____ Date _____

Inspection Item Or System	Inspection Interval					Condition					Action Taken and Notes		
	Daily	Weekly	Month.	13 Wk.	26 Wk.	O.K.	Adjust	Repair	Replace	Lube	Clean	Indicate corrective action taken and the date. Make any special notations.	DATE
CRUSHER	Bolts & Clamps	X		✓									
	Rotor	✓											
	Rotor Balance					✓							
	Hammers	✓											
	Hammer Pins				✓								
	Liners	✓											
	Screen Grates	✓											
	Brg. Mtg. Bolts	✓											
	Bearing Housing	✓											
	Bearings				✓	✓							
	Bearing Seals				✓	✓							
	Lube System	✓											
	Filters		○	✓									
	Hydraulics	✓											
	Safety Devices				✓								
DRIVE	Control & Wiring					✓							
	Motor Connections					✓							
	Motor Mounting					✓							
	Motor Bearings					✓							
	Flexible Coupling					✓							
	V-Belts		✓										
	Sheaves		✓										
	Reducer			✓									
	Guards	✓											
MISC.	Feed System	✓											
	Discharge System	✓											
	Other Equipment	✓											

X indicates only for first 40 hours

O indicates only after first 40 hours

4-3 Trouble Shooting

TROUBLE	PROBABLE CAUSE	SOLUTION
1. Crusher will not operate.	1. No electrical power.	1. Check fuses and replace if blown. 2. Check wiring for broken or loose connections and repair if necessary.
	2. Motor burned out.	1. Replace motor.
	3. Crusher bearing seized.	1. Check oil or grease supply and replace bearing.
	4. V-Belts broken.	1. Replace belts and check for cause (see V-BELT MAINTENANCE).
	5. Material blocking or bridged.	1. Lock out disconnect switch and inspect inside of crusher. Remove blockage if necessary. Relieve bridging.
	6. Mechanical interference inside crusher.	1. Lock out disconnect switch and inspect inside of crusher. Remove interference and repair any damaged parts.
2. Low crushing capacity.	1. Insufficient feed.	1. Check feed system for malfunction and correct as required.
	2. Incorrect rotor speed.	1. Check original assembly drawing for correct speed and revise if different from actual running speed.
	3. Wet, sticky material.	1. Eliminate from feed.
	4. Hammers, impeller, rotor badly worn.	1. Rebuild if necessary. Check to see that feed is uniform across crusher opening or rotor width.
	5. Belts slipping.	1. Readjust belt tension.
	6. Discharge restricted due to material build-up caused by insufficient takeaway capacity.	1. Clean out discharge. Redesign of discharge chutes may be necessary or increase takeaway capacity.
	7. Feed not uniform across opening.	1. Correct feed system to deliver material uniformly across feed opening.
	8. Insufficient motor horsepower.	1. Increase horsepower. Check with your Jeffrey Representative for the maximum allowable horsepower.
	9. Feed blocked.	1. Clean out feed. Redesign of feed chute may be necessary or slow down feed rate.
3. Excessive vibration.	1. Crusher anchor bolts loose.	1. Retorque anchor bolts (see THREADED FASTENERS section).
	2. Foundation not solid or uneven.	1. Check foundation and repair.
	3. Rotor out of balance.	1. Rebalance rotor (see BALANCING).
	4. Broken or missing hammers.	1. Replace and rebalance (see BALANCING).
	5. Motor and rotor shafts misaligned.	1. Realign shafts.
	6. Bearing hold-down bolts loose.	1. Retorque bolts.

TROUBLE	PROBABLE CAUSE	SOLUTION
4. Excessive wear.	1. Feed not uniform across opening.	1. Correct feed system to deliver material uniformly across feed opening.
	2. Tramp material in feed.	1. Take measures to eliminate tramp material.
	3. Abrasive feed material.	1. Remove abrasives from feed.
5. Bearings overheating	1. Insufficient lubricant.	1. Check lubrication system and correct any blockages.
	2. Lubrication deteriorated or contaminated.	1. Clean bearings and replace lubricant.
	3. Incorrect internal clearance.	1. Check and readjust if required (see BEARINGS — Repair section).
	4. Bearing over-loaded due to bent shaft.	1. Repair or replace shaft as necessary.
	5. Wrong lubricant for bearing operating temperature.	1. Change lubricant.
	6. Misaligned bearings.	1. Check clearance between shaft and seal with a feeler gauge. Clearance should be the same at 90 degree intervals around the shaft on line seals. Note the drag on the gauge as it is pulled out. This drag should be the same at 90 degree intervals around the shaft at each bearing. Readjust housings in slotted holes if misalignment is found.
6. Undersize product.	1. Screen openings too close.	1. Increase screen openings.
	2. Rotor speed too fast.	1. Decrease rotor speed for most materials. For some materials, this will not work. Consult Jeffrey before any speed change.
	3. Too many hammers.	1. Reduce number of hammers evenly around rotor, so that balance is maintained. This is not always possible, and for some applications not desirable. Consult Jeffrey before changing hammer arrangement.
7. Oversize product.	1. Screen openings too far apart.	1. Decrease screen openings.
	2. Rotor speed too slow.	1. Increase rotor speed for most materials. However, on some materials this will not work. Consult Jeffrey before any speed change.
	3. Worn hammers or rotor.	1. Rebuild or replace hammer or rotor as necessary.
	4. Too few hammers.	1. Increase hammers evenly around rotor so that balance is maintained. This is not always possible, and for some applications, not desirable. Consult Jeffrey before changing hammer arrangement.

4 Repair:

a. Safety Precautions:

1. Obtain permission from your supervisor before starting work.
2. Inform the operator before starting work.
3. Inform supervisor in feed system area to insure feed is stopped during maintenance.
4. Be absolutely sure the disconnect switch is locked out and fuses pulled. Padlock this switch box to insure no one can open it or close the switch.
5. Do not work on crusher alone. Always have another person with you. In case of an accident, this person can render assistance.
6. Be sure to have adequate lifting devices and proper tools to avoid personal injury while lifting heavy parts.
7. Be sure to reinstall guards, shields and other safety devices when the work is completed. Inform the operator and feed system supervisor when work is completed and insure that all personnel are clear of the crusher.
8. Avoid extended exposure close to machinery which exceeds safe noise levels.
9. Use proper care and safe procedures in handling, moving, installing, operating and maintaining the crusher and replacement parts.

10. Other potential hazards to personnel may also be associated with the crusher. All personnel working in or passing through the area should be warned by signs and should be trained to exercise general safety precautions.

11. Provide adequate ventilation and/or respiration devices for personnel welding inside or around the crusher or its parts.

12. Insist on good housekeeping in and around the crusher during maintenance work. Remove refuse and non-salvageable materials from around the crusher. Keep cords, hoses and rigging from being scattered around to prevent tripping hazards. Keep oil, grease and water spills cleaned up to prevent slipping and falling injuries.

13. Promote safe working practices to avoid burns from hot operations such as welding and cutting. For example, issue and insist on use of heavy welding gloves and face masks during welding.

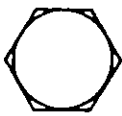
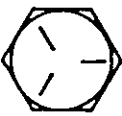
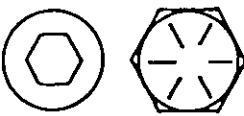
b. Threaded Fasteners:

The work performed and the physical unbalance of the rotating crushing member will cause vibration. This vibration can damage bearings, foundations, and shake nuts and bolts loose in a matter of hours.

Bolts used in Jeffrey crushers are grade 5 (high strength) and during manufacture are tightened to at least the torque value shown in Table 2.

TABLE 2.

RECOMMENDED TIGHTENING TORQUES — FT-LBS (NEWTON-METERS)

WRENCH OR SOCKET SIZE	THREAD SIZE	FOR ALL MILD STEEL FASTENERS (GRADE 2 OR ORDINARY CAP SCREWS OR BOLTS)	FOR SAE GRADE 5 HEX HEAD CAP SCREWS AND BOLTS AND FOR FLAT HEAD SOCKET CAP SCREWS	FOR SOCKET HEAD CAP SCREWS AND SAE GRADE 8 HEX HEAD CAP SCREWS WHEN STANDARD SPRING LOCK WASHER IS USED UNDER HEAD
	UNC			
7/16	1/4-20	6 (8.14)	8 (10.8)	12 (16.3)
9/16	3/8-16	20 (27.1)	30 (40.7)	45 (61.0)
3/4	1/2-13	50 (67.8)	75 (102)	110 (149)
15/16	5/8-11	100 (136)	150 (203)	220 (298)
1-1/8	3/4-10	175 (237)	260 (353)	380 (515)
1-5/16	7/8-9	165 (224)	430 (583)	600 (814)
1-1/2	1-8	250 (339)	640 (868)	900 (1220)
1-11/16	1-1/8-7	350 (475)	800 (1080)	1280 (1740)
1-7/8	1-1/4-7	500 (678)	1120 (1520)	1820 (2470)
2-1/4	1-1/2-6	870 (1180)	1940 (2630)	3160 (4280)

Lubrication, other than that used for rust prevention on the fastener, is not used at assembly. When additional lubrication is used, tightening torques should be reduced by approximately 25%.

It is widely accepted that a threaded fastener will not loosen if tightened sufficiently to produce a clamping force (or preload) in excess of the greatest load to be encountered in service. In applications where cyclic loading and/or vibration are factors, proper additional tightening of all threaded fasteners is essential.

The following information has been prepared and compiled to be used by field personnel. It is intended that this information be used as a guide to improve the quality of maintenance and not as a hard and fast rule.

When tightening fasteners to recommended values, field personnel should use calibrated torque wrenches. Recommended tightening torques have been assigned values below the maximum safe limits to provide an adequate safety tolerance.

During the first fifty (50) hours of operation under load, the torque of the bolts should be checked a minimum of every eight (8) hours. Always check bearing holddown and crusher anchor bolts. Spot check the fasteners on the liners, housing connections and covers. If one or more bolts in a joint, or those holding an individual part, are below the recommended torque values, all bolts for that part or joint should be checked. After the critical or so-called "stretch and set" period, the frequency of checking and retorquing can be reduced to that required to assure that all bolts remain tight. NEVER assume a threaded fastener will always remain tight. They should be checked periodically.

Bolts with damaged threads or bolts that show signs of elongation or reduction in cross section should be replaced.

c. V-Belt Drive Maintenance:

1. Check alignment of sheaves. Shafts should be parallel.
2. Maintain uniform tension. Idle belts should appear snug; in motion they have a slight sag on slack side (see Figure 5 page 7).
3. Avoid heat. Above 140F (60C) rubber is overcured and belt life is shortened.
4. Keep drives well ventilated. Avoid heat build-up.
5. Never mix belts on a drive. Use new belts of the same brand.
6. Always use matched sets of belts.
7. Never use belt dressing, as this makes belts soft, reducing life.
8. Worn sheaves reduce belt life. Check sheaves frequently.
9. Oil bearings carefully. Oil accidentally spilled on belts causes rubber to swell and belts to fail prematurely.
10. Never force belts onto sheaves. Always release the take-up.
11. Equalize slack before tightening; all the slack should be on the top (see Figure 5, page 7).

TROUBLE — WHAT TO LOOK FOR — HOW TO CORRECT IT:

Loss in Driven Speed

Check for slip.

Shut down drive — test sheave temperature by feel.

A slipping belt will heat sheave excessively.

Check for proper tension.

Localized Wear

Check belt cross section dimensions.

If narrow — pulley is spinning.

If full — internal breakdown with resultant swell.

Unequal Stretch

Internal breaks.

Broken strength member.

Excessive Elongation

Check for overload. Check for internal breaks.

Check amount for take-up since initial installation.

Ply Separation

Excessive tension, if premature.

Defective belt.

Opening of Cover Seams

Check for oil or rubber solvent on belt.

Abnormal Cover Wear

Check for worn sheave, slip, heat, chemical fumes, obstructions or abrasive condition.

Belt Softening or Swelling

Check for oil or rubber solvent.

Belt Cover Hardening and Cracking

Check for excessive heat and chemical fumes.

d. Balancing:

WARNING

The rotor may rotate anytime a hammer, impeller bar, weld deposit or any other weight is added or removed. This movement could injure personnel working on the rotor. Therefore, always block the rotor to prevent any possible movement and possible injury to personnel.

All Jeffrey rotors have been dynamically balanced using electronic balancing with computer generated programs at our factory. To maintain a safe and troublefree operation, consideration MUST be given to balance when replacing or rebuilding rotating parts. Field balancing is a matter of weight being EVENLY AND SYSTEMATICALLY distributed on the total rotating mass.

All units will be operating with some degree of imbalance and corresponding vibration amplitude. This is satisfactory as long as it is within a reasonable limit (see Table 3, page 22). With

very little effort, the maintenance crew can economically keep the crusher within the vibration range desired or as originally shipped. Hammers or impeller bars are subject to the most wear and are the most critical items in maintaining good balance. Each new or rebuilt hammer should be weighed and distributed as per Figures 6, 7, or 8. These figures show swing type hammers, but the same procedure and principle applies for any hammer, impeller bar or weld deposit. The more accurately the weight is distributed, the lower the vibration level will be. Never indiscriminately place a single hammer or impeller in a rotor. Always counterbalance with an equal weight per applicable distribution diagram. It is recommended that replacement hammers be kept in preweighed sets.

1. Rebuilding and Balancing: To extend their usable life, crushers with rotors of the spider arm type and those with solid rotors will require deposits of hardsurfacing and/or build-up in areas where wear is likely to occur. This procedure must be closely controlled to assure proper weight distribution and maintain a reasonable vibration level. The weld deposits cannot be weighted as you weigh a replacement part, so some other method must be used. One way is to predetermine to what length an electrode of a given type and size will be burned. Do the required welding, burning each stick to the predetermined length and drop the dead ends into a tub or can.

After the hardsurfacing or build-up is complete in one location, count the number of ends. In this way, an equal amount of weld can then be deposited in the required location for necessary counter-balance.

NOTE: When hardsurfacing or rebuilding ALWAYS counter-balance the rotor or the rotor may become so OUT OF BALANCE that special dynamic balancing equipment will be required to restore it to a safe and acceptable vibration level.

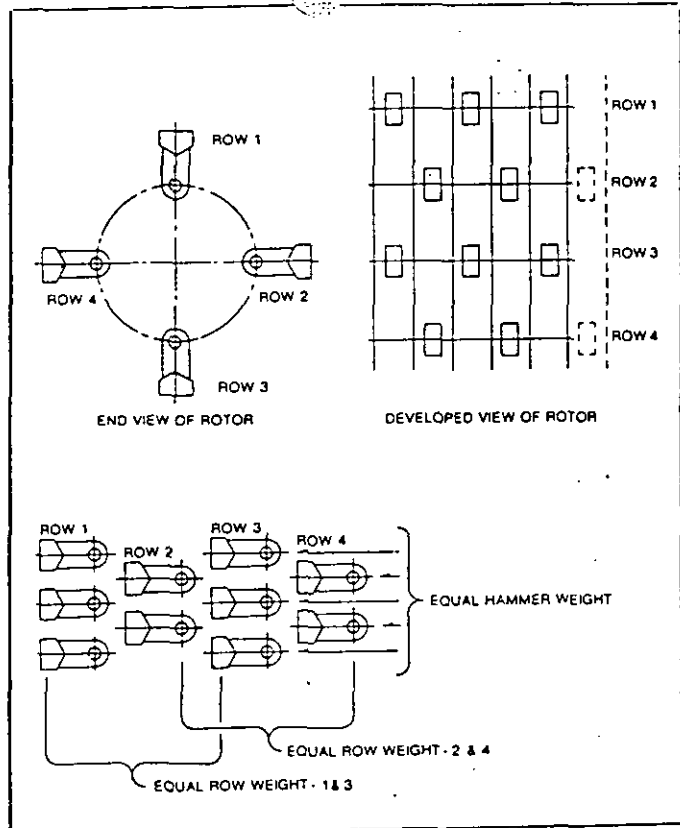


Figure 7 — Typical Hammer Distribution for Rotors having Four Rows of Hammers

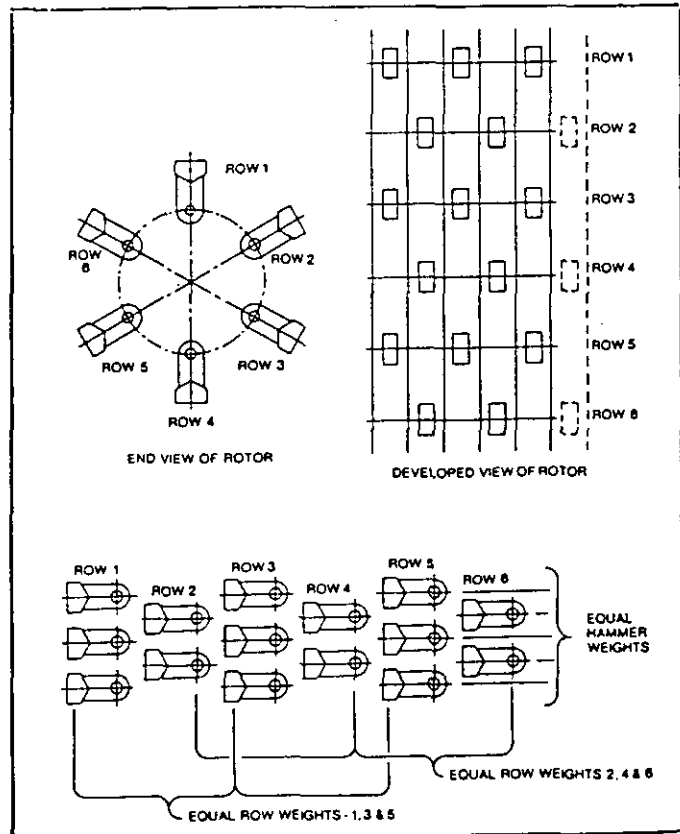


Figure 8 — Typical Hammer Distribution for Rotors having Six Rows of Hammers.

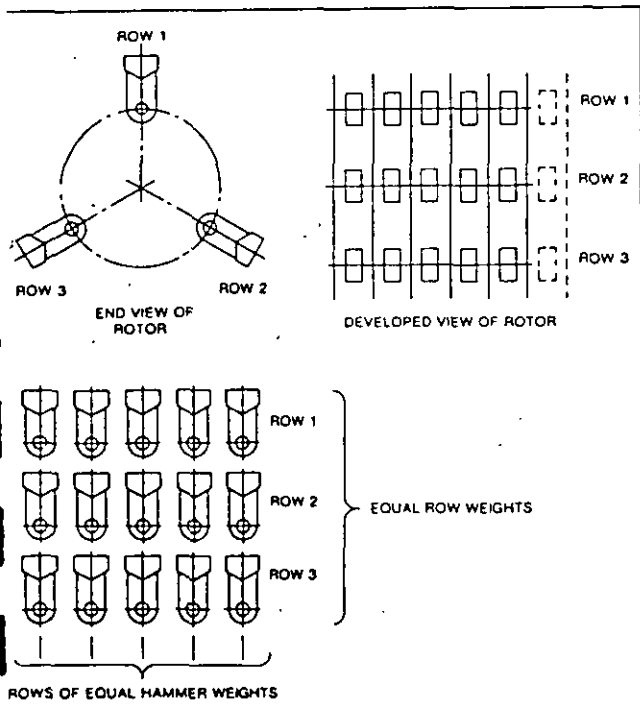


Figure 6 — Typical Hammer Distribution for Rotors having Three Rows of Hammers

2. Field Balance Correction: The operating personnel should be capable of detecting a change in the vibration level of a unit just by its sound and feel. They will be the first to know if a balance correction is in order. SOME field corrections, without special equipment, can be effective if the following preparations and conditions are met:

(a) All connections between the drive unit and the crusher should be removed.

(b) All hammers, pins, impellers should be removed from the rotor.

(c) The rotor should be free to roll in the bearings.

(d) Attach a temporary weight to the rotor so that the rotor can be rotated by hand.

When these requirements are met and the rotor is rotated and allowed to come to rest, the lightest side will be at the upper most point of the rotor. If the rotor comes to rest WITHOUT a back-and-forth motion, the rotor is either reasonably well balanced or is too tight in the bearings for this method of correcting balance. When the light side of the rotor is established, weight is then temporarily attached to the light side. (The weight should be located on the outside ends of the rotor so it will not be knocked or worn off during operation, and should be equally distributed on both ends). By trial and error, find the proper magnitude and location of the weight so that the rotor can be hand rotated and it will come to a slow gradual stop in a DIFFERENT place each time. After the best possible distribution of weight has been achieved, an equal amount of weight that was required for balancing MUST BE REDUCED from the amount of welding rod that will be required for securing the weight. After welding, recheck the balance and adjust if required. For example if a five pound weight is required for balancing and one pound of weld metal is required for welding this weight; the balance weight must be reduced from five pounds to four pounds.

The basic rotor is now as closely balanced as possible without the aid of special equipment. Before installing rotor components, bring the unit up to normal operating speed and, by feel and sound, determine if the vibration level is within the acceptable limit as when first put into service. The weighing and proper placement of rotor components, as per the weight distribution diagram, will keep the rotor within the required range.

If it becomes necessary to use electronic vibration analyzing equipment, the hammers and pins should be removed so that the basic rotor can be balanced. Rechecking and adjusting the hammer weight for the complete rotor is advisable. See Table 3, for recommended vibration levels for use with a vibration analyzer. The values indicated in the table are for a rotor assembly complete with hammers and all components.

If the unbalanced vibration amplitude exceeds the maximum limit, the unit must be rebalanced. Care must be taken to balance below or at the preferred level.

Notice:

Jeffrey can furnish trained and experienced service repre-

TABLE 3

Maximum Normal Operating Speed (RPM)	MAXIMUM Peak-To-Peak Vibrating Amplitude in Mils (mm)	
	Crusher Tip Path Diameter 42" and under	Crusher Tip Path Diameter Greater than 42"
500	5.0 (0.13)	10 (0.25)
600	5.0 (0.13)	10 (0.25)
700	5.0 (0.13)	9.4 (0.24)
800	5.0 (0.13)	9 (0.23)
900	5.0 (0.13)	8.7 (0.22)
1000	5.0 (0.13)	7.7 (0.20)
1200	5.0 (0.13)	6.6 (0.17)
1800	5.0 (0.13)	— —
2400	5.0 (0.13)	— —

sentatives with electronic vibration analysis equipment for precise electronic balancing should you require this service. For further information contact your local Jeffrey representative or the Jeffrey Service Department in Woodruff, SC.

e. Welding:

The repair of a crack in the weld or base metal or a crusher housing requires a repair weld deposit of the same size as originally used. The following are general instructions for what we feel are the best procedures for surface preparation and electrode application.

1. Surface Preparation. Remove grease and oil with a solvent, rust and dirt with a wire brush. Using ARCAIR* (or equal) gouging, or a grinder, COMPLETELY prepare the crack. The sides of the prepared area must be chamfered to an included angle of 40-60 degrees to allow the electrode to penetrate into the root of the prepared joint.

2. Preheating. Preheating is not required except for bringing the area to be welded up to 70-100 F (21-38 C). Preventing the weld area from dropping below this temperature until the welding is completed will greatly improve the quality of the weld and is strongly recommended.

3. Electrode and Application. A small diameter (³/₁₆ inch or 4.76 mm maximum) low hydrogen E7018 stick electrode deposited in straight stringer beads is recommended. All slag must be removed prior to making another pass. All welding must be free from undercuts, inclusions and blowholes. After the weld has been brought to size, allow it to cool slowly. **DO NOT QUENCH!!**

NOTE: LOW HYDROGEN WELDING ROD MUST BE THOROUGHLY DRY WHEN USED.

CAUTION

When welding on or around your crusher, NEVER connect the ground cable so the welding current

*ARCAIR Torch is manufactured by ARCAIR Company, Lancaster, Ohio and sold thru distributors.

will pass through the bearings. If welding is to be performed in the crushing chamber, take the ground cable inside with you. When welding on the rotor, ground to the rotor. When welding on the frames, ground to the frames. Passage of an electrical current through the bearings will cause extremely high electrical resistance at the narrow contact point between each roller and race. The heat generated through arcing will soften the bearing metal at these points and can cause premature bearing failure.

4. Hard-surfacing: Hard-surfacing is a welding process whereby an alloy is deposited on a metallic part to form a protective surface which resists abrasion, impact, heat, corrosion, or a combination of these.

The amount of hard-surfacing required depends on your particular application. There are many types of hard-surface welding rods to choose from depending on the amount of resistance to wear desired due to impact and abrasion. Some are listed below. Jeffrey has standardized on Lincoln Electric* welding products as listed below. If your welding engineer has an equivalent, it will accomplish the same purpose.

(a) Medium-carbon low-alloy steel rods: These materials have excellent impact strength and reach full hardness as deposited, but only fair to poor abrasion resistance. They are generally used for build-up of severely worn steel parts. Lincoln's Jet-LH BU-90* is a typical welding rod in this group.

(b) Semi-austenitic alloy rods: These materials have improved abrasion resistant while retaining moderate impact strength. In addition these alloys work-harden rapidly. Lincoln's Abrasoweld* is a typical material in this group.

(c) Crominium-carbide and tungsten carbide alloys: These materials have the highest abrasion resistance of the hard-surfacing materials. Their impact resistance is poor. They are generally used as a cover for the build-up rods in group (a). Examples of typical Crominium-carbide rods are Lincoln's Faceweld 1* (less impact strength than Abrasoweld, but better abrasion resistance); and Faceweld 12* (exceptional abrasion and corrosion resistance, but lowest impact strength of the Lincoln products).

Actual field conditions for a crusher may require a rod with more or less resistance to either impact or abrasion, depending on the material being processed. The above list is intended as a guide to help in the selection of rod properties for a given application.

Welding required for the proper maintenance of internal rotor parts is specialized for varying materials use and the function they are to perform. Detailed instructions for welding rotors are given in the Specific Instruction Manual for your crusher type.

Bearings:

1. Split Sleeves: The two halves of a split sleeve bearing are machined in pairs and must be stocked and installed as a pair. The halves are not interchangeable.

To replace, remove the bearing housing cap on each end of the shaft. (It will be necessary to lift the shaft slightly in order to remove the lower half of the sleeve.)

Clean and deburr the housing before installing the new sleeve. Check your parts list drawing to assure that all dowel pins, end caps and grease fittings are in place. Lightly coat the outside surface of each half of the sleeve with a soft grease.

2. Antifriction Bearing (one-piece housing): The mounting and dismounting instructions are as follows: Mounting and Dismounting.

(a) Check the surface of the shaft and its ends for burrs. Lightly coat the shaft with a graphite and oil solution or a soft grease.

(b) Slip the bearing with housing on the shaft, position it on the support, and bolt the housing securely in place.

(c) Tighten both locking collar setscrews firmly onto the shaft. This assures positive shaft location.

(d) To dismount, reverse the above procedure.

3. Antifriction Bearings (split housing): The antifriction bearings used on Jeffrey crushers are mounted on the shaft with an interference fit. This is accomplished either by using a tapered seat on the shaft, or by shrinking the bearing on a straight shaft seat. Also on relatively few bearings, a tapered adapter sleeve is used. The degree of interference or forced fit depends on bearing size and type.

If a bearing must be removed and is suitable for further service, the same care must be used as for mounting a new bearing. Normally, if a bearing that is serviceable must be dismantled, work on the rotating crushing member between the bearings may be required. Therefore, removal of the complete assembly with the pillow blocks intact is preferable. The assembly can then be moved to a suitable work area for dismantling the bearings.

The following instructions are for dismantling a single bearing, with the rotating member in place in the crusher.

To dismount a serviceable bearing, begin with adequate and proper tools.

(a) Study parts list drawings until you are familiar with the assembly.

(b) Thoroughly clean the outside of the housing and the area around it.

(c) For units equipped with bearing fill blocks (see Figure 2, page 5) remove the housing hold-down bolts from both bearings. Raise the shaft and pillow block just enough ($1/16$ to $1/8$ in. or 1.56 to 3.125 mm) so the fill block can be removed. Remove the fill block and support the bearing housing base so it will not drop when the cap is removed.

(d) Unbolt the shrouds on each side of the housing (if so equipped) and slide them out and away from the housing. (See parts list drawings.) Remove the housing cap and lower

*Trade names for welding products manufactured by the Lincoln Electric Company of Cleveland, Ohio.

the housing base and remove this base. (NOTE: Fill blocks and housing parts can be very heavy and may require lifting equipment.)

(e) For units without bearing fill blocks, remove the bearing housing hold-down bolts from the housing on each side of the crusher. Remove any covers, crusher housing parts, or internal liners that would prevent the shaft and each pillow block from being raised to a distance equal to the drop of the pillow block (dimension from the center line of shaft to the bottom of the housing). Raise the shaft and support it in place on each side of the crusher. Leave the housing, in which the bearing to be dismantled is located, free so that the cap and base can be removed.

(f) Provide adequate protection and clean surrounding for parts after removal. (If a part requires cleaning, do it before storing with clean parts.) Wrap the bearing in clean oilproof paper while awaiting reassembly.

(g) Match-mark parts to insure proper reassembly.

(h) Bend the tang of the lockwasher out of the locknut before attempting to remove the locknut. Some locknuts are equipped with a lock plate instead of a washer; this lockplate must be removed (see Figure 9). Always use a new lock washer when reassembling.

(i) Rotate the locknut counter clockwise (when looking toward the shaft end) and leave locknut on the shaft. The bearing can now be removed from the shaft seat or adaptor. (See HYDRAULIC DISMOUNTING.)

(j) When removing a serviceable antifriction bearing with an interference fit, NEVER pull or apply force through the outer ring to move the inner ring. ALWAYS apply the required force evenly to the inner ring.

If the bearing is unserviceable, or will never be reused, it can be dismantled by any method THAT WILL NOT DAMAGE THE SHAFT.

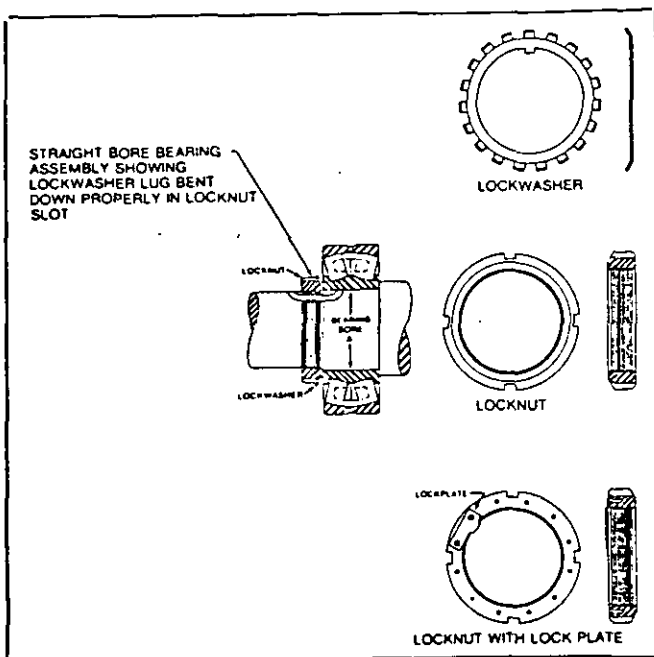


Figure 9 — Typical Bearing Locking Devices

4. Mounting Cylindrical Bore Bearings: All cylindrical bore antifriction bearings used in Jeffrey crushers are mounted with an interference fit. To prevent bore and shaft damage, they are heated (expanding the bore enough to be slipped onto the shaft) and then allowed to shrink onto the seat. The same procedure is recommended for field mounting. Heating should only be done by submerging the bearing in a clean bath consisting of 20% soluble oil in water (one part oil to four parts water by volume). Set the bearing on spacers or a rack to keep it about one inch (25 mm) off the bottom of the container and fill the container to a minimum of one inch (25 mm) over the bearing (see Figure 10). Slowly bring the bath mixture to a boil and allow sufficient time for the bearing to reach the bath temperature to assure sufficient expansion for it to be slipped over the shaft seat.

With the bearing setting off the bottom of the container, and covered with the oil-water mixture, it CANNOT be overheated. The mixture is not flammable, drains off easily and leaves an oil film. The film is sufficient for rust protection while assembling the complete pillow block, provided the bearing is to be immediately installed.

WARNING

The bearing will be about 215-230F (95-120C). Hand protection MUST be used when handling heated bearings.

Leave the bearing in the boiling bath until all steps leading to the actual placement of the bearing on the shaft have been completed. Check and recheck parts list drawings to assure all parts that assemble around the shaft on the inboard side of the

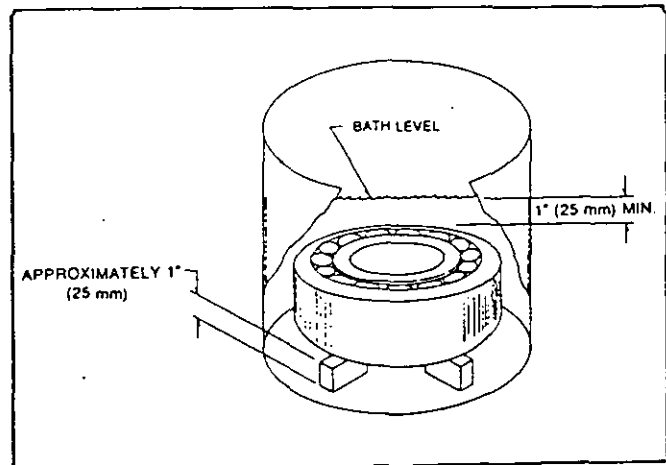


Figure 10 — Heating Cylindrical Bore Bearings

NOTE: The oil bath level should be at least one inch (25 mm) above the bearing. The container and bath mixture must be clean and free of all corrosive materials.

WARNING

The boiling point for the oil-water mixture will be 215-230 F (102-110 C). Use extreme care when handling the container and the bearing.

TABLE 4

RECOMMENDATIONS FOR DRIVING A SPHERICAL ROLLER BEARING
ONTO A TAPERED SEAT (VALUES IN INCHES AND/OR MILLIMETERS)

Bearing Bore mm		Reduction in Radial Internal Clearance Inch (mm)		Minimum Permissible Final Clearance After Mounting Bearing with Clearance Inch (mm)
OVER	INCLUDING	MINIMUM	MAXIMUM	C3
40	50	.0010 (.0250)	.0012 (.0300)	.0012 (.0300)
50	65	.0012 (.0300)	.0015 (.0375)	.0014 (.0350)
64	80	.0015 (.0375)	.0020 (.0500)	.0016 (.0400)
80	100	.0018 (.0450)	.0025 (.0625)	.0020 (.0500)
100	120	.0020 (.0500)	.0028 (.0700)	.0025 (.0625)
120	140	.0025 (.0625)	.0035 (.0875)	.0030 (.0750)
140	160	.0030 (.0750)	.0040 (.1000)	.0035 (.0875)
160	180	.0030 (.0750)	.0045 (.1125)	.0040 (.1000)
180	200	.0035 (.0875)	.0050 (.1250)	.0040 (.1000)
200	225	.0040 (.1000)	.0055 (.1375)	.0045 (.1125)
225	250	.0045 (.1125)	.0060 (.1500)	.0050 (.1250)
250	280	.0045 (.1125)	.0065 (.1625)	.0055 (.1375)
280	315	.0050 (.1250)	.0075 (.1875)	.0060 (.1500)
315	355	.0060 (.1500)	.0085 (.2125)	.0065 (.1625)
355	400	.0065 (.1625)	.0090 (.2250)	.0075 (.1875)
400	450	.0080 (.2000)	.0105 (.2625)	.0080 (.2000)
450	500	.0085 (.2175)	.0110 (.2750)	.0090 (.2250)

NOTE: The axial displacement of the bearing is approximately 16 times the clearance reduction.

and outer ring. In small and medium size bearings, the roller weight can be overcome and lifted by the feeler blade. In large bearings where considerable roller weight is involved (some rollers can weigh as much as 5 - 6 lbs. or 2.2 - 2.7 kg.), a means must be provided to raise the outer ring so the measurement can be made at the top of the bearing. (When reducing the internal clearance, the outer ring must be free.) Continue to reduce the internal clearance and continue the gaging procedure until the proper reduction is made. With larger bearings, where the outer ring cannot be rotated while measuring, the feeler blade must be passed through the clearance and withdrawn with the swiveling motion previously described for gaging unmounted bearings.

7. Lockwasher and Nut: After the proper clearance reduction is made, remove the locknut and wipe the shaft or sleeve threads, the face of the bearing inner ring, and the outside surface of the nut with a clean, lint-free paper to remove any excess oil and graphite mixture. Place the lockwasher on the shaft against the bearing ring with the inner prong toward the bearing and in the slot of the sleeve or keyway in the shaft. Replace the locknut with chamfered side toward the washer and bearing. With a spanner wrench and hammer, drive the nut up tight, but do not reduce the clearance

of the bearing any further. Line up a slot in the locknut with the closest tab on the lockwasher in the tightening direction and bend the tab down into the slot (see Figure 9, page 24)

8. Cleaning Bearings:**WARNING**

Use extreme caution in storing and handling petroleum solvents due to their explosive and toxic nature. Consult your local fire marshal for safe storing and handling procedures of these potentially dangerous materials.

WARNING

Never energize the motor of a crusher with the bearing cap removed or when the bearing has a flushing or cleaning fluid in the housing. Always rotate by hand.

Oils and grease should be removed in the early stages of deterioration or contamination to avoid unnecessary difficulty.



W.O. NO. 82-105



ASTEC INDUSTRIES, INC.

PROPOSAL NO. _____

DISTRIBUTION	
ACCOUNTING	_____
ENGINEERING	_____
MANUFACTURING	_____
SALES	_____
OTHER	_____

WORK ORDER AUTHORITY

FOR ISSUE

FOR CHANGE

CHANGE NO. _____



ANDERSON COLUMBIA CO., INC.

2316 Hwy. 71 • Marianna, FL 32448

TO: 1-904-752-7585
 Lake City office (Tommy R.)

QUANTITY	MODEL NUMBER	
1		<p>Portable recycle crushing plant as per the following:</p> <ul style="list-style-type: none"> a) 20 ton feeder bin w/grizzley & reciprocating plate feeder. b) Triple roll crusher - 40" c) 30" conveyor - crusher to screen d) 4' X 10' two deck Kolberg screen e) 24" conveyor - screen to fine material surge pile f) 24" conveyor - screen to coarse material surge pile. g) 24" conveyor - screen reject return to crusher h) All electrical to be self-contained on unit.

PAINT-STANDARD OTHER
 IF OTHER-NAME & NUMBER _____

TO BE SHIPPED BY 2-15-82 DATE

VIA _____

OTHER INFORMATION _____

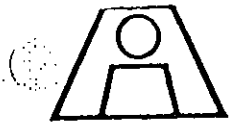
SHIP TO _____

SPECIAL ROUTING _____

12-29-82
DATE

Don Brock
SALESMAN/ENGINEER

* INDICATES DIFFERENT FROM STANDARD. REFER TO ATTACHED MEMO OR QUOTATION.



ASTEC INDUSTRIES, INC.

P.O. BOX 2787 • 4101 JEROME AVENUE • CHATTANOOGA, TENNESSEE 37407 • 615-867-4210

DRAWING #	DESCRIPTION		
DRAWINGS AND SCHEMATICS			
RC-149	RECYCLE CRUSHER SYSTEM (ASSEMBLY)		
RC-108	APRON FEEDER		
RC-152	APRON FEEDER DRIVE		
RC-150	SCREEN FEED CONVEYOR		
CV-1077	SCREEN FEED CONVEYOR DRIVE		
RC-128	INCLINE COARSE CONVEYOR		
CV-1053	INCLINE COARSE CONVEYOR DRIVE		
RC-104	INCLINE RETURN CONVEYOR		
CV-1005	INCLINE RETURN CONVEYOR DRIVE		
RC-103	INCLINE FINE CONVEYOR		
CV-1003	INCLINE FINE CONVEYOR DRIVE		
82-092 SH 1-4	ELECTRICAL SCHEMATICS		



ASTEC INDUSTRIES INC.

P.O. BOX 2787 • 4101 JEROME AVENUE • CHATTANOOGA, TENNESSEE 37407 • 615-867-4210

MANUFACTURER'S INSTALLATION AND MAINTENANCE INSTRUCTIONS

DOC. NO.	DESCRIPTION	MANUFACTURER
	LUBRICATION INFORMATION	ASTEC
	JEFFREY CRUSHERS MODEL 40 TR	JEFFREY-DRESSER
32-26A	BEARINGS, SERIES 22500	BROWNING
309-19	U. S. VARIDRIVE	U. S. MOTORS
529B	BUSHINGS, SURE-GRIP	WOODS
IM-257-A	MOTORS, FRAMES 143T thru 445T	LINCOLN
373-120	REDUCERS, SINGLE & DOUBLE REDUCTION	FALK
378-850	REDUCERS, INSTALLATION OF INT. BACKSTOP	FALK
378-120	REDUCERS, INSTRUCTIONS FOR INSTL. & MAINT.	FALK
378-890	REDUCERS, GREASE PURGE	FALK
128-010	REDUCERS, TYPICAL LUBRICANTS	FALK
2106-B	BACKSTOP CLUTCH	FORMSPRAG
	BEARINGS, INSTALLATION & LUBRICATION	SEALMASTER
USM-2410	VIBRATING SCREEN	DEISTER

8V 22 40

CUSTOMER C.W. MATTHEWS

JOB NO. 82-105

EQUIPMENT RECYCLE CRUSHER SYSTEM

BM	DRAWING NAME	DWG. NO.	NOTES or REVISIONS	DATE	I
✓	RECYCLE CRUSHER SYSTEM	RC-149		2-3-83	CC
✓	FINE PRODUCT CONVEYOR	RC-103	4/	1-26-83	CC
✓	INCLINE RETURN CONV.	RC-104	3/	1-26-83	CC
✓	APRON FEEDER	RC-108	2/ 3/ CC 2-2-83	1-28-83	CC
	SCREEN HOPPER	RC-110		1-26-83	CC
✓	COARSE ^{CONVEYOR} PRODUCT	RC-128	1/ 2/ TR 2-3-83	1-26-83	CC
	" " DETAILS	RC-129	1/	1-26-83	CC
	" " SUPPORT	RC-130		1-26-83	CC
	RECYCLE CRUSHER BIN	RC-132	1/ CC 1-31-83	1-26-83	CC
	SCREEN SUPPORT	RC-133	1/ CC 2-2-83	1-26-83	CC
	GRIZZLEY	RC-134	2/	1-27-83	CC
	CHARGING HOPPER COARSE PRODUCT CONV.	RC-135		1-26-83	CC
	RETURN CONVEYOR LOADING HOPPER	RC-136		1-26-83	CC
	LANDING PADS	RC-137	1/ CC 2-3-83	1-26-83	CC
	CRUSHER SYSTEM SUPPTS	RC-138		1-26-83	CC
	BULK HEAD	RC-142		1-26-83	CC
✓	FINE PRODUCT CONV. DRIVE	CV-1003		1-26-83	CC
	" " DRIVE GUARD	CV-152#38		1-26-83	CC
✓	RETURN CONV. DRIVE	CV-1005		1-26-83	CC
	" " DRIVE GUARD	CV-152#18		1-26-83	CC
	BELT SCRAPER	CV-1010	ONE 36" - ONE 24" COARSE P.C.	1-26-83	CC
	TAIL SHAFT TAKE-UP	CV-1011	FOR RETURN CONVEYOR.	1-26-83	CC
	HEAD SHAFT TAKE-UP	CV-1014	FOR FINE PROD. CONV.	1-26-83	CC
✓	COARSE PRODUCT ^{DRIVE} CONV.	CV-1053		1-26-83	CC
	" " DRIVE GUARD	CV-1043#4		1-26-83	CC
✓	CONVEYOR TO SCREEN DRIVE	CV-1077		1-26-83	CC
	CONVEYOR TO SCREEN DRIVE GUARD	CV-152#43		1-26-83	CC
	RECYCLE CRUSHER FRAME	RC-146	1/ CC 2-2-83	1-27-83	CC
	MISC. SUPPORTS	RC-143	1/	2-3-83	CC

D = drawing contains BM F = BM in file NR = BM not req'd

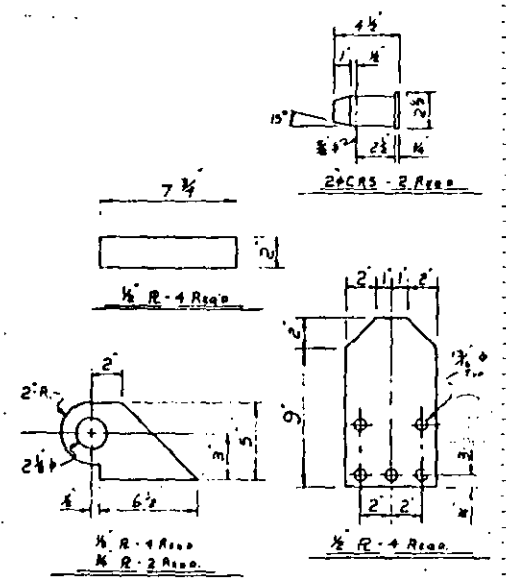
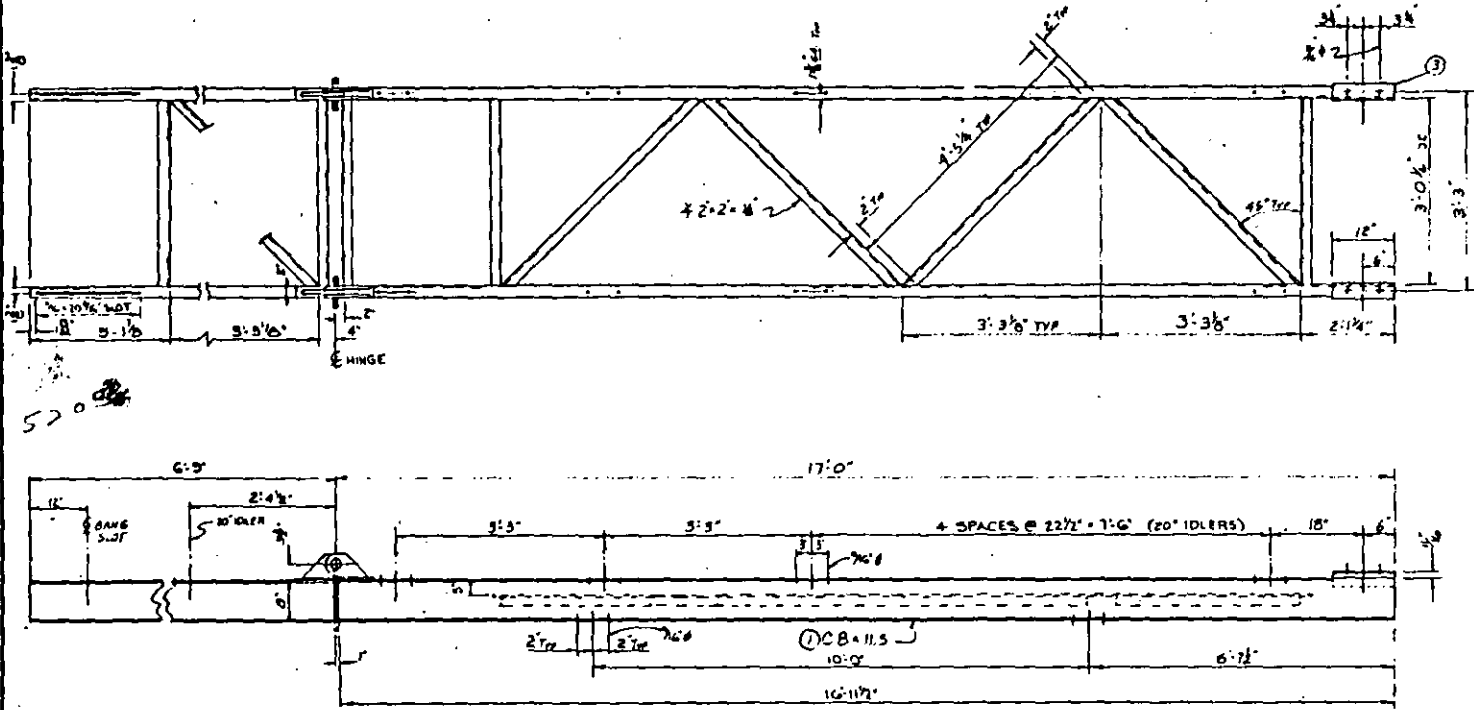
CUSTOMER C.W. MATTHEWS JOB NO. 82-105

EQUIPMENT RECYCLE CRUSHER SYSTEM

BM	DRAWING NAME	DWG. NO.	NOTES or REVISIONS	DATE	I
✓	FRAME-INCLINE TO ^{SCREEN}	RC-150		2-3-83	CC
	CRUSHER DISCHARGE ^{HOPPER}	RC-148		2-1-83	CC
	CRUSHER CHARGING ^{HOPPER}	RC-147	1/2-2-83 CC	1-28-83	CC
	PLATFORM & HANDRAILS				
✓	APRON FEEDER DRIVE	RC-152	1/2-24-83 CC	2-23-83	CC
	" " DRIVE GUARD	CV-1043		2-23-83	CC
	CRUSHER DRIVE MOUNT				
	APRON FEEDER DRIVE - - SHAFT SKETCH	- 8 1/2 x 11 sketch		2-9-83	CC
	Handrails for Crusher	RC-151	1/3-31-83 / 2/4-4-83 CC	2-23-83	CC
	TIP HOLDERS FOR CRUSHER ROLL	RC-153		2-24-83	CC
	TIP ARRANGEMENT	RC-154	1/3-14-83 CC	2-24-83	CC
	BIN WALL EXT	RC-155		2-24-83	CC



LIST OF COMPONENTS			
ITEM NO.	DESCRIPTION	SIZE	REMARKS
1	CB-11.5		
2	2" x 2" x 1/2"		
3	2" x 2" x 1/2"		
4	1/2" R		
5	1/2" R		
6	2" x 2"		
7	2" x 2" x 30T	TANBRALL 10144	
8	2" x 2" x 30A	"	ACTUAL 10144
9	CONCRETE CAST		
10	1" x 1/2" x 12" x 3/8" x 1/2" x 1/2" x 1/2" x 1/2"		
11	1" x 1/2" x 12" x 3/8" x 1/2" x 1/2" x 1/2" x 1/2"		
12	2" x 2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"		
13	2" x 2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"		
14	1" x 1/2" x 12" x 3/8" x 1/2" x 1/2" x 1/2" x 1/2"		
15	2" x 2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"		
16	2" x 2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"		
17	2" x 2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"		
18	2" x 2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"		
19	1" x 1/2" x 12" x 3/8" x 1/2" x 1/2" x 1/2" x 1/2"		
20	4" x 4" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"		



NO.	REVISION	BY	DATE
1	AS PER 10/15		

ASTCO INDUSTRIES, INC.
 700 21ST ST • 2ND FLOOR • LEBANON, OHIO 45031

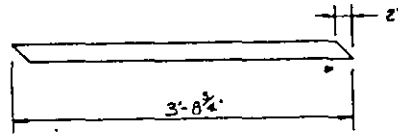
Project Name: **FINE PRODUCT CONVEYOR**

Customer: **PERKINS DESIGN**

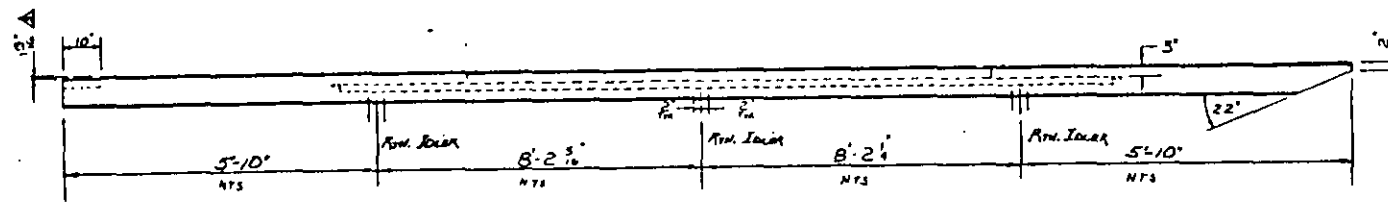
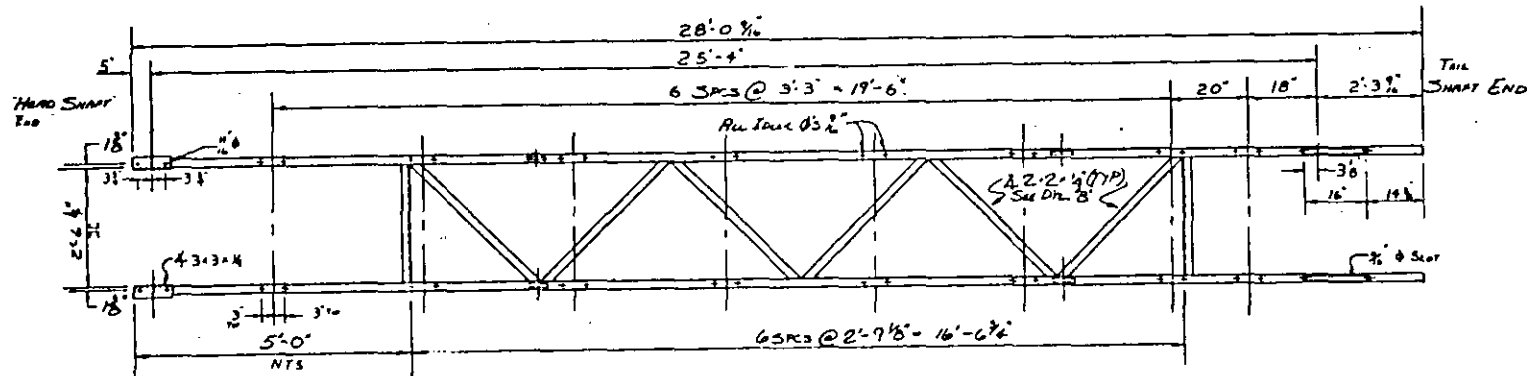
DATE	BY	APP'D	CHECKED	DATE
10/15				

WARNING: DO NOT OPERATE CONVEYOR WITHOUT PROPERLY TRAINED OPERATORS. ALWAYS WEAR SAFETY BELT AND HELMETS. ALWAYS WEAR SAFETY SHOES. ALWAYS WEAR SAFETY GLASSES. ALWAYS WEAR SAFETY GLOVES. ALWAYS WEAR SAFETY HEADGEAR. ALWAYS WEAR SAFETY EARRINGS. ALWAYS WEAR SAFETY TONGS. ALWAYS WEAR SAFETY CHAINS. ALWAYS WEAR SAFETY LIFELINES. ALWAYS WEAR SAFETY ANCHORS. ALWAYS WEAR SAFETY FALL ARRESTERS. ALWAYS WEAR SAFETY NETS. ALWAYS WEAR SAFETY BARS. ALWAYS WEAR SAFETY RAILS. ALWAYS WEAR SAFETY GUARDS. ALWAYS WEAR SAFETY COVERS. ALWAYS WEAR SAFETY CAPS. ALWAYS WEAR SAFETY HATS. ALWAYS WEAR SAFETY VESTS. ALWAYS WEAR SAFETY VESTERS. ALWAYS WEAR SAFETY BELTS. ALWAYS WEAR SAFETY BELTERS. ALWAYS WEAR SAFETY SHOES. ALWAYS WEAR SAFETY SHOEERS. ALWAYS WEAR SAFETY GLASSES. ALWAYS WEAR SAFETY GLASSERS. ALWAYS WEAR SAFETY GLOVES. ALWAYS WEAR SAFETY GLOVINGERS. ALWAYS WEAR SAFETY HEADGEAR. ALWAYS WEAR SAFETY HEADGEARERS. ALWAYS WEAR SAFETY EARRINGS. ALWAYS WEAR SAFETY EARRINGERS. ALWAYS WEAR SAFETY TONGS. ALWAYS WEAR SAFETY TONGERS. ALWAYS WEAR SAFETY CHAINS. ALWAYS WEAR SAFETY CHAINERS. ALWAYS WEAR SAFETY LIFELINES. ALWAYS WEAR SAFETY LIFELINERS. ALWAYS WEAR SAFETY ANCHORS. ALWAYS WEAR SAFETY ANCHORERS. ALWAYS WEAR SAFETY FALL ARRESTERS. ALWAYS WEAR SAFETY FALL ARRESTERS. ALWAYS WEAR SAFETY NETS. ALWAYS WEAR SAFETY NETTERS. ALWAYS WEAR SAFETY BARS. ALWAYS WEAR SAFETY BARBERS. ALWAYS WEAR SAFETY RAILS. ALWAYS WEAR SAFETY RAILERS. ALWAYS WEAR SAFETY GUARDS. ALWAYS WEAR SAFETY GUARDERS. ALWAYS WEAR SAFETY COVERS. ALWAYS WEAR SAFETY COVERERS. ALWAYS WEAR SAFETY CAPS. ALWAYS WEAR SAFETY CAPERS. ALWAYS WEAR SAFETY HATS. ALWAYS WEAR SAFETY HATERS. ALWAYS WEAR SAFETY VESTS. ALWAYS WEAR SAFETY VESTERS. ALWAYS WEAR SAFETY BELTS. ALWAYS WEAR SAFETY BELTERS. ALWAYS WEAR SAFETY SHOES. ALWAYS WEAR SAFETY SHOEERS.

LIST OF COMPONENTS			
ITEM NO.	DESCRIPTION	SIZE	REMARKS
1	6x11.5		
2	4x2.2.4		
3	10' BARS WITH WELDING DOTS & B410-247		
4	2 BARS WITH WELDING DOTS & B410-247		
5	2 BARS WITH WELDING DOTS & B410-247		
6	2 BARS WITH WELDING DOTS & B410-247		
7	2 BARS WITH WELDING DOTS & B410-247		
8	2 BARS WITH WELDING DOTS & B410-247		
9	2 BARS WITH WELDING DOTS & B410-247		
10	2 BARS WITH WELDING DOTS & B410-247		
11	2 BARS WITH WELDING DOTS & B410-247		
12	2 BARS WITH WELDING DOTS & B410-247		
13	2 BARS WITH WELDING DOTS & B410-247		
14	2 BARS WITH WELDING DOTS & B410-247		
15	2 BARS WITH WELDING DOTS & B410-247		



DETAIL B
4x2.2.4 6 ROD



NO.	REVISION	BY	DATE
1	ADD'S ITEM 11		1-2-77
2	ADD'S ITEM 12		1-2-77
3	ADD'S ITEM 13		1-2-77

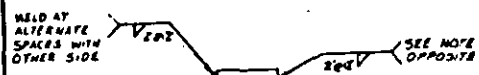
ASTRO INDUSTRIES, INC.
 7000 2007 1000 1000 1000 1000 1000 1000

PROJECT NAME: INCLINE RETURN CONVERTER
 1/24' BELT

SCALE: AS SHOWN

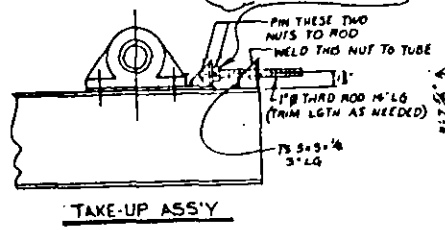
DATE: 5-10-77

WARNING: ALL DIMENSIONS ARE IN FEET AND INCHES. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.



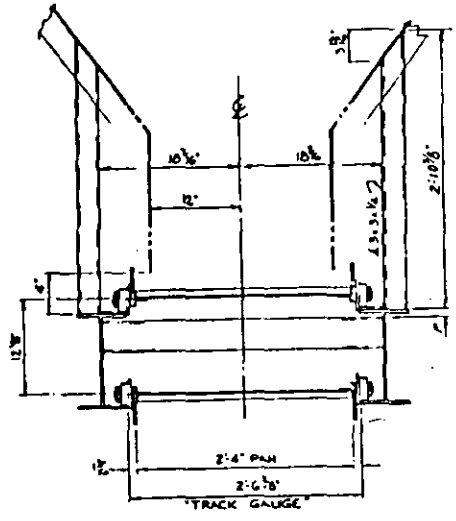
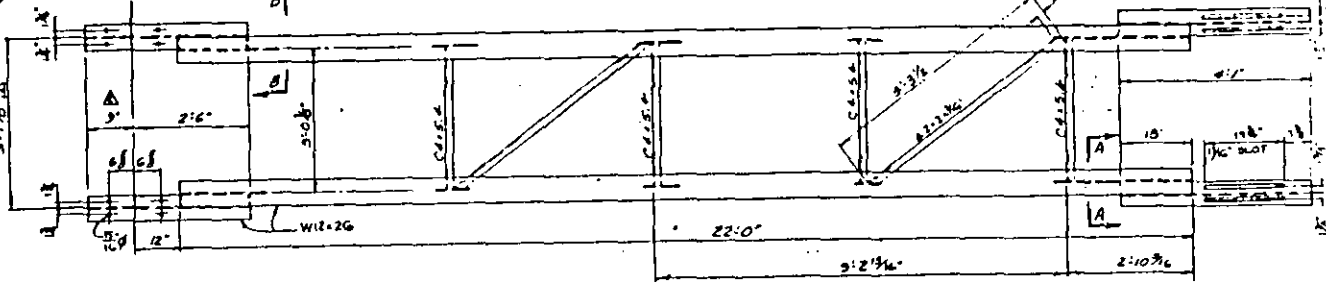
BEARING SLIDE R. CAN BE MOVED IN EITHER DIRECTION BY TURNING THIS NUT.

DETAIL C

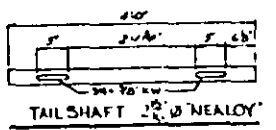


TAKE-UP ASS'Y

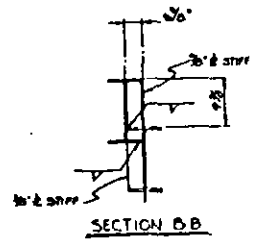
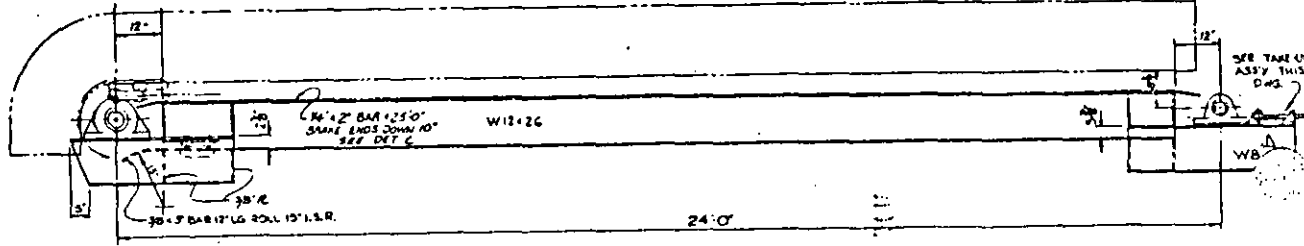
LIST OF COMPONENTS			
QTY	DESCRIPTION	ITEM QTY	REMARKS
2	1" DIA THRD ROD W/ 3 1" DIA NUTS	1	W12-26
2	TRK BEARINGS SEALASTER 2" DIA 1 1/2\"/>		
2	HEAD BEARINGS SEALASTER 2" DIA 1 1/2\"/>		
2	1\"/>		
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1	30 FT 2 1/2\"/>		
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2	1\"/>		



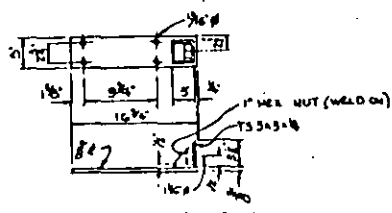
TYP SECTION THRU APRON FEEDER & BIN



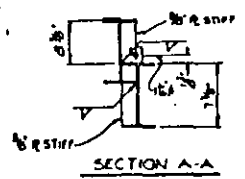
TAILSHAFT 2\"/>



SECTION B-B



BEARING SLIDE ASSY
2 REQ'D



SECTION A-A

NO.	REVISION	BY	DATE
1	CHG'D BEARINGS 2" DIA - END	CC	7-2-55
2	SPREAD HEAD BACK OUT, CHG'D TAKE-UP	CC	7-7-55
3	MOVED HEAD SECTION A TO COVER SEE SECTION B-B. ALSO CHG'D END	CC	11-3-55

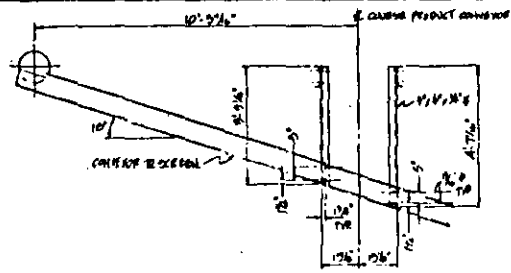
ASTRO INDUSTRIES, INC.
P. O. BOX 1107 • 1000 WEST 40TH ST • DALLAS, TEXAS 75210

Part Name: **25'-24\"/>**

STANDARD 10 FOOT ROLLERS ARE USED UNLESS OTHERWISE SPECIFIED
 ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED
 DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED

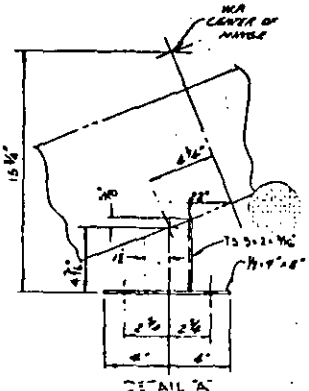
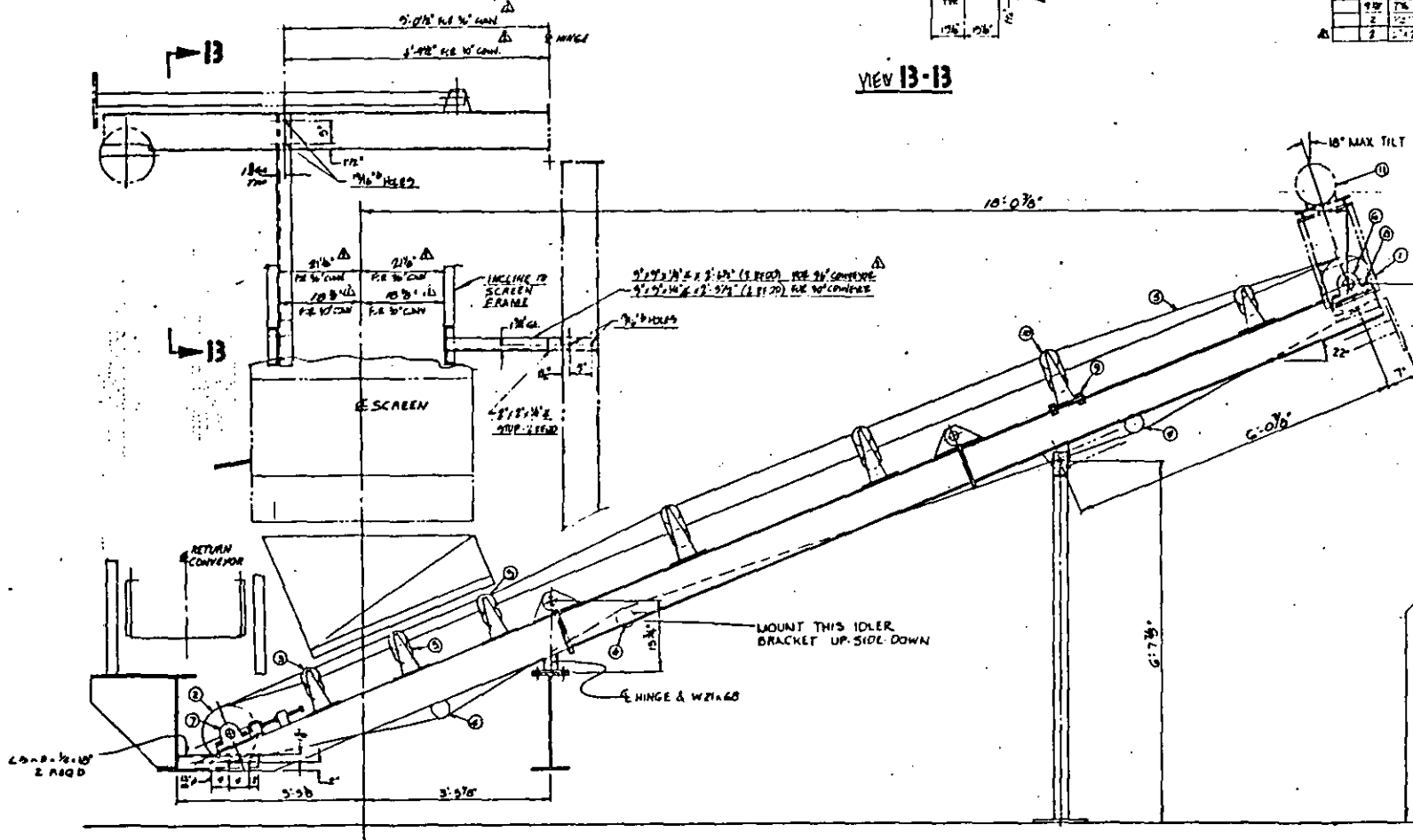
DATE	BY	CHECKED	DATE

RC-108



VIEW 13-13

LIST OF COMPONENTS			
ITEM NO.	DESCRIPTION	SIZE	REMARKS
1	LAGGED HEAD PULLEY	12" DIA. x 2" SHIMS - 2" BORE	
2	SLATTED TAIL PULLEY	12" DIA. x 2" SHIMS 1 1/2" BORE	
3	TRANSALL 20" IDLER	# R420-24T	
4	TRANSALL RETURN IDLER	# R200-24R WITH TAIL BAR	
5	50 FT 24" CONVEYOR BELT		
6	DRIVING BEARING	FD 250 - 2" BORE	
7	DRIVING BEARING	FD 250 - 2" BORE	
8	3/8" UNC HEX HEAD BOLT	2 L.S. 1" HEX NUT & L.W.	
9	20	7/8" UNC	1" DIA. S
10	3	TRANSALL 35" IDLER	# R435-25T
11	DRIVE ASSY		
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NO.	REVISION	BY	DATE
2	REVISION (NEW) FOR CONVEYOR SYSTEM	EE	8-1-75
1	ADDED DIMENSIONS TO DRAWING SET	EE	1-1-75

ASTRO INDUSTRIES, INC.
 2700 10TH ST. S.W. ALBUQUERQUE, N.M. 87105

COARSE PRODUCT CONVEYOR ASSY

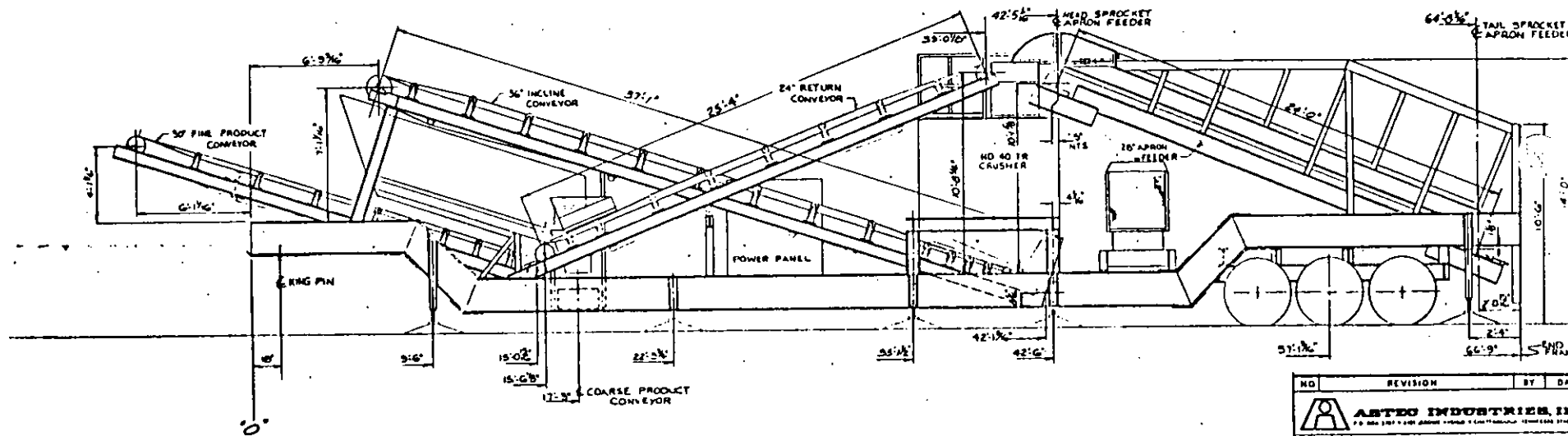
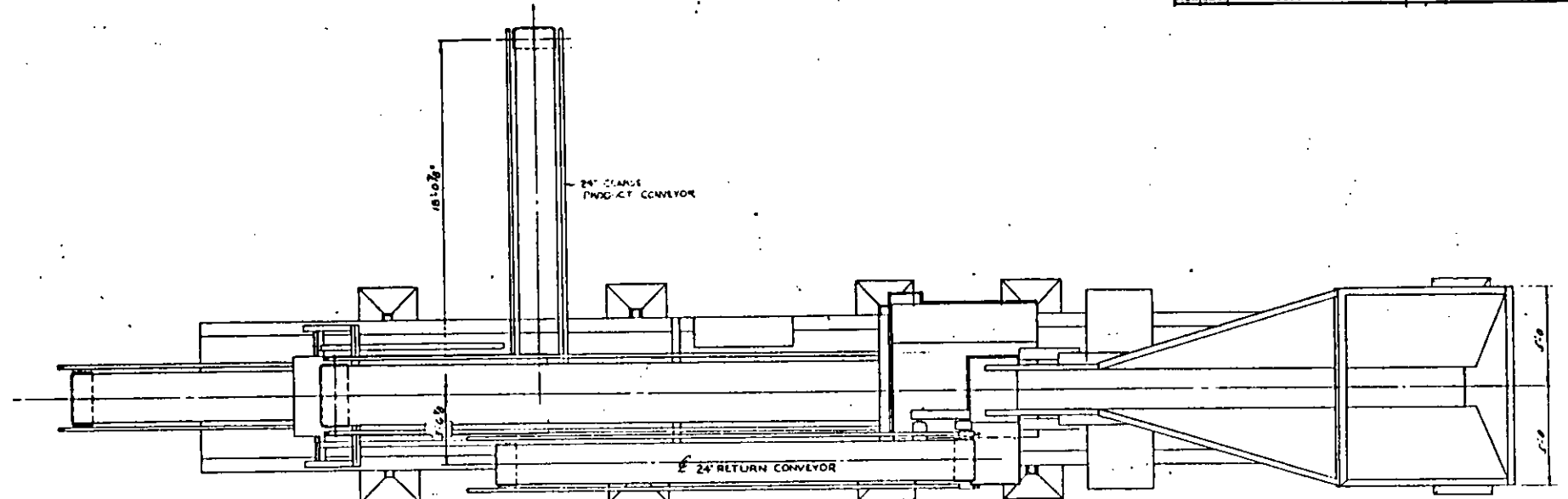
PROJECT: RECYCLE CRUS-1R SYSTEM

DATE: 8-1-75

RC-129

WARNING: DO NOT OPERATE THIS CONVEYOR SYSTEM WITHOUT THE PROPER SAFETY DEVICES. ALWAYS WEAR YOUR SAFETY BELT AND HELMET. ALWAYS USE THE SAFETY DEVICES. ALWAYS WEAR YOUR SAFETY BELT AND HELMET. ALWAYS USE THE SAFETY DEVICES.

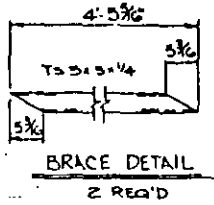
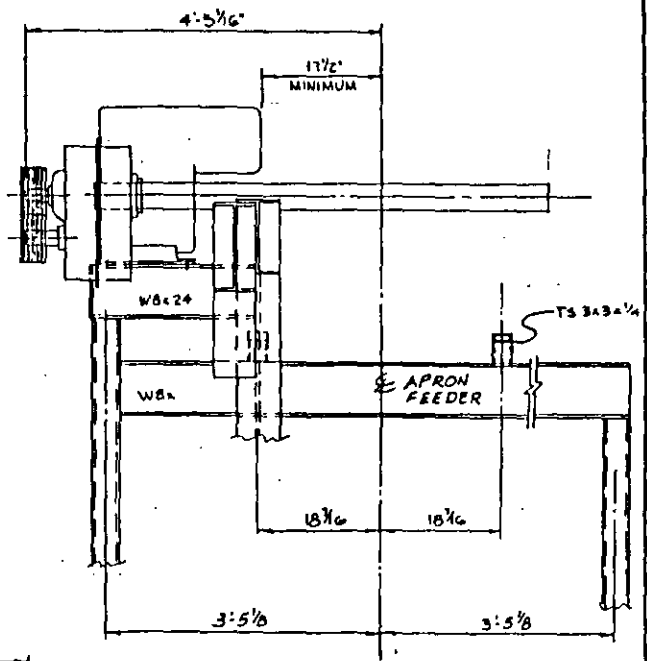
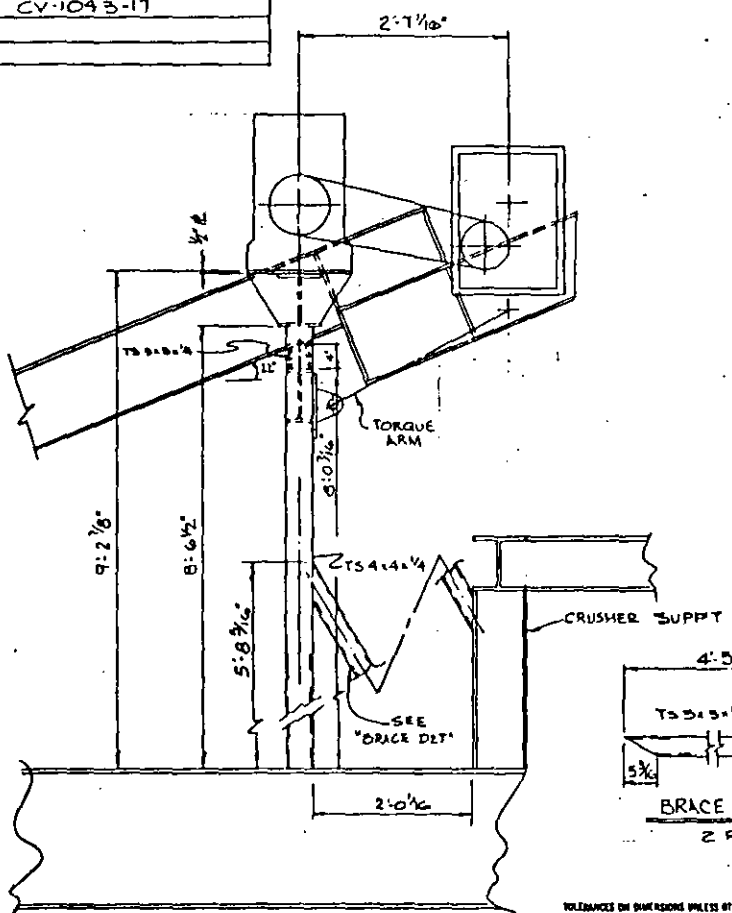
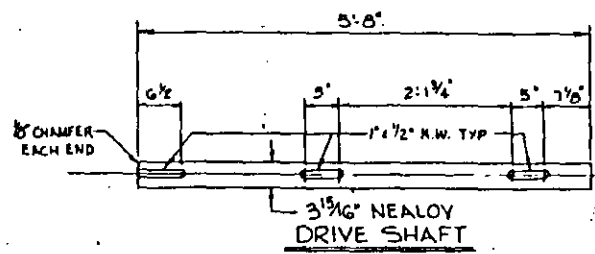
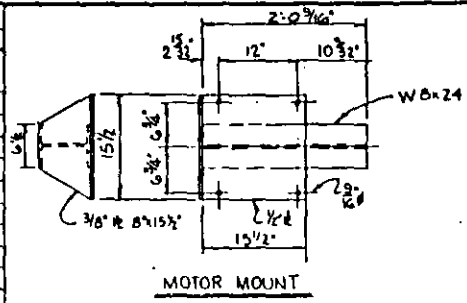
LIST OF COMPONENTS			
ITEM/QUANTITY	DESCRIPTION	SIZE	REMARKS



NO.	REVISION	BY	DATE
ASTEC INDUSTRIES, INC. P.O. BOX 2387 • 4001 ASTEC DRIVE • DAYTON, OHIO 45424-2387			
RECYCLE CRUSHER SYSTEM			
MODEL: MINATA MODEL AS JEFFERD CRUSHER			
DATE	TIME	DATE	TIME
RC-149			

NOTES: 1. ALL DIMENSIONS ARE IN FEET AND INCHES. 2. ALL DIMENSIONS ARE TO CENTER UNLESS OTHERWISE SPECIFIED. 3. ALL DIMENSIONS ARE TO CENTER UNLESS OTHERWISE SPECIFIED. 4. ALL DIMENSIONS ARE TO CENTER UNLESS OTHERWISE SPECIFIED.

BILL OF MATERIAL		
ITEM	QTY	DESCRIPTION
1	1	10HP US VARIDRIVE MOTOR SIZE 25 SUPER STD. # 6195 FRAME 25-21ST TYPE VEU-TF-GH
2	1	FALK SHAFT MTD REDUCER F5D15JR-25
3	1	MOTOR SHEAVE 5V7.10-5 GROOVE
4	1	BUSHING 1.5F-1.54 BORE
5	1	REDUCER SHEAVE 5V9.0-5 GROOVE
6	1	BUSHING "E"-2V4" B
7	3	V BELTS COG TYPE 5VX800 MATCHED
2-1"		W8x24
1		1/2" R 13 1/2" x 1 5/2"
17'		TS 4 x 4 x 1/4
1		3/8" R 8" x 1 5/2"
1		DRIVE GUARD CV-1043-17
5'-8"		3 1/8" NEALDY
3'-3"		TS 3 x 3 x 1/4



1 ADDED BRACE DET [C] 2-24-51

ASTEC INDUSTRIES, INC.
 P.O. BOX 1187 • 40th AVENUE • CHATTANOOGA, TENNESSEE 37402

CUSTOMER

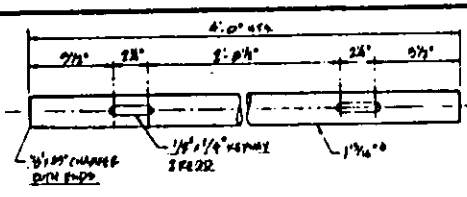
PART NAME
APRON FEEDER DRIVE & MOUNT

MACHINE

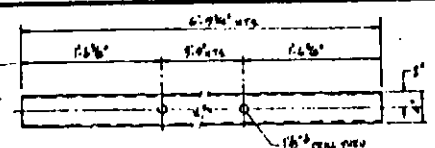
DRW: C.CHEEK CWB: APPR: DATE: 2-25-83

JOB NO. SHEET NO. SCALE: 1"=1'-0" DWG NO: RC-152 REV: 1

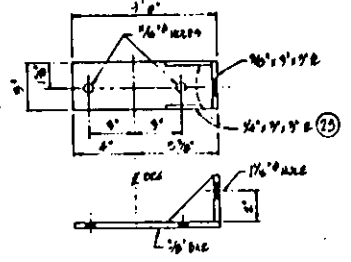
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE NOTED ARE: (PLUS OR MINUS)
 MACHINING .010" — STRUCTURAL OVERALL 1/16" — ALL DIMS 1/32" NON ACCUMULATING
 THIS DRAWING AND THE BRACE SHOWN THEREIN IS THE PROPERTY OF ASTEC
 INDUSTRIES, INC. AND USE OR REPRODUCTION THEREOF WITHOUT WRITTEN CONSENT



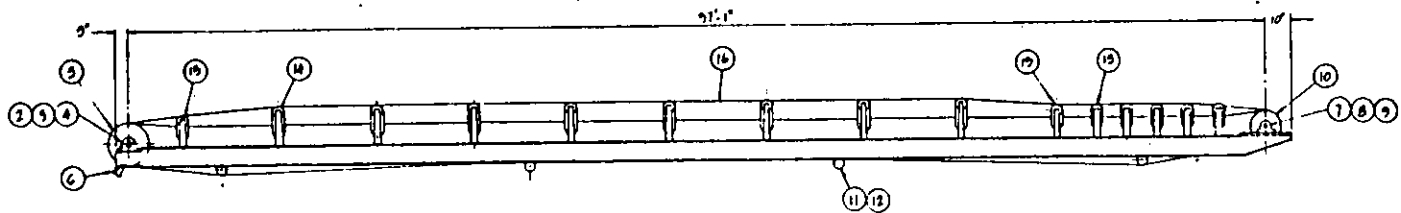
⑨ TAIL SHAFT
SEE C. 130



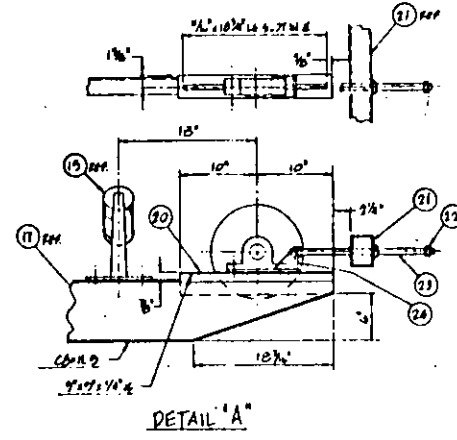
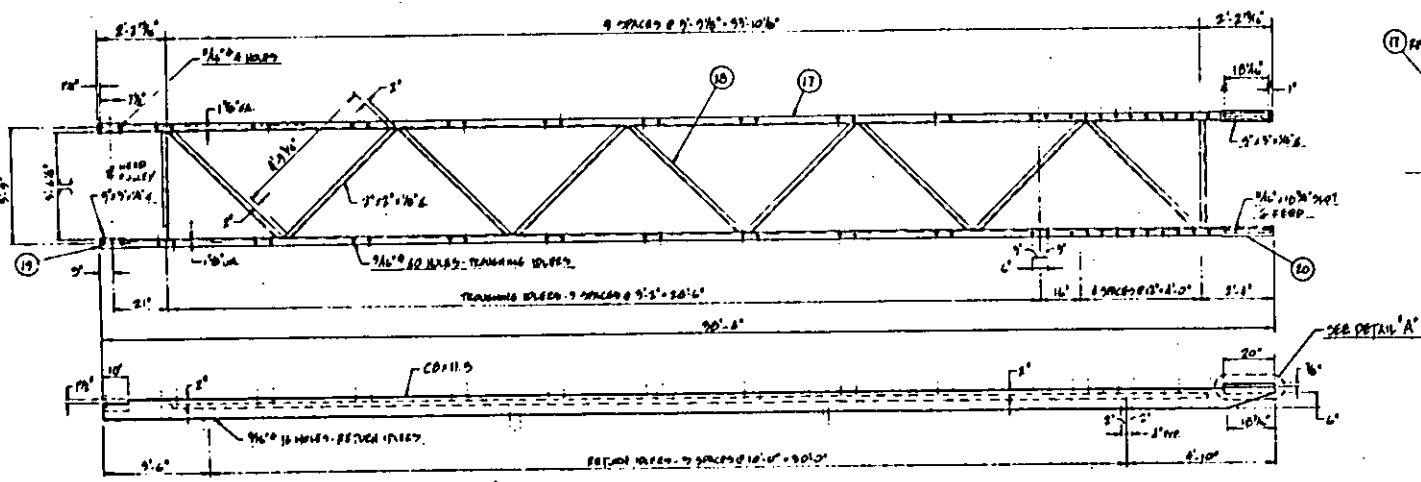
⑪ 4\"/>



⑫ SLIDE B. FOR TAIL BEARING
ONE AT 3\"/>



ASSEMBLY



DETAIL 'A'

ITEM QUANTITY	DESCRIPTION	SITE	REMARKS
1	1/8\"/>		
2	2\"/>		
3	2\"/>		
4	1/8\"/>		
5	1\"/>		
6	1\"/>		
7	1\"/>		
8	1\"/>		
9	1\"/>		
10	1\"/>		
11	1\"/>		
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17	1\"/>		
18	1\"/>		
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23	1\"/>		
24	1\"/>		
25	1\"/>		

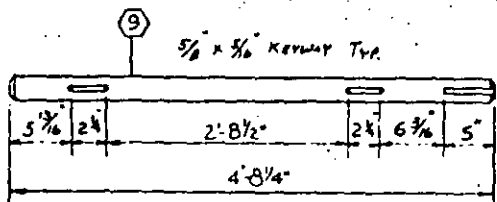
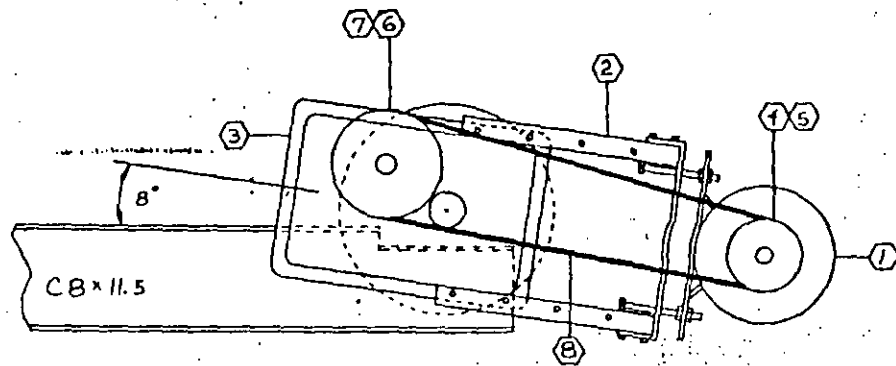
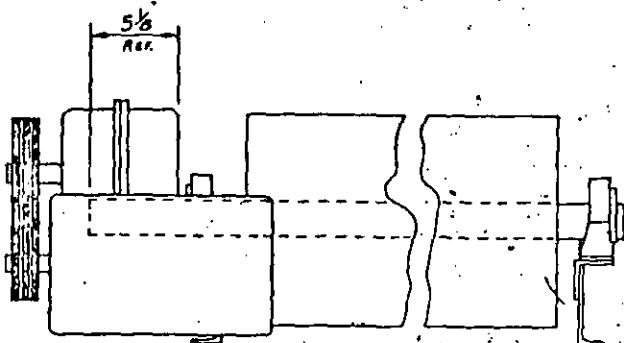
REVISIONS TO BE MADE BY THE DESIGNER OR HIS REPRESENTATIVE
 ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED ARE IN INCHES
 DIMENSIONS IN PARENTHESIS ARE IN MILLIMETERS
 DIMENSIONS IN FEET AND INCHES ARE TO THE NEAREST 1/16\"/>

NO.	REVISION	BY	DATE
1			

ASTRO INDUSTRIES, INC.
 7000 S. 10th St. - Tulsa, Oklahoma 74117
 PHONE: 937-2222
 FAX: 937-2222
 MAILING ADDRESS: 9601 S. DANFORTH - CRUSHED TO SCREEN


LIST OF COMPONENTS

ITEM	QUAN	DESCRIPTION
1	1	10 HP-1800 RPM TEFC (215T)
2	1	FALK MOTOR MOUNT M2207-1
3	1	FALK SHEET MOUNT REDUCER - C71 ROTATION W/BACKSTOP EEC7 JRS
4	1	MOTOR SHAFT 3V6.00-3 GROOVE
5	1	BUSHING SDS-1 3/4 BORE
6	1	REDUCER SHAFT 3V8.00-3 GROOVE
7	1	BUSHING SK-1 1/2 BORE
8	3	V-BELT 3V800 (MATCHED)
9	1	CAS 2 1/2 φ C1018 4'-8 1/4"
10	1	DRIVE GUARD Dwg# CV-152 # 13



HEADSHAFT
2 1/2" φ C1018

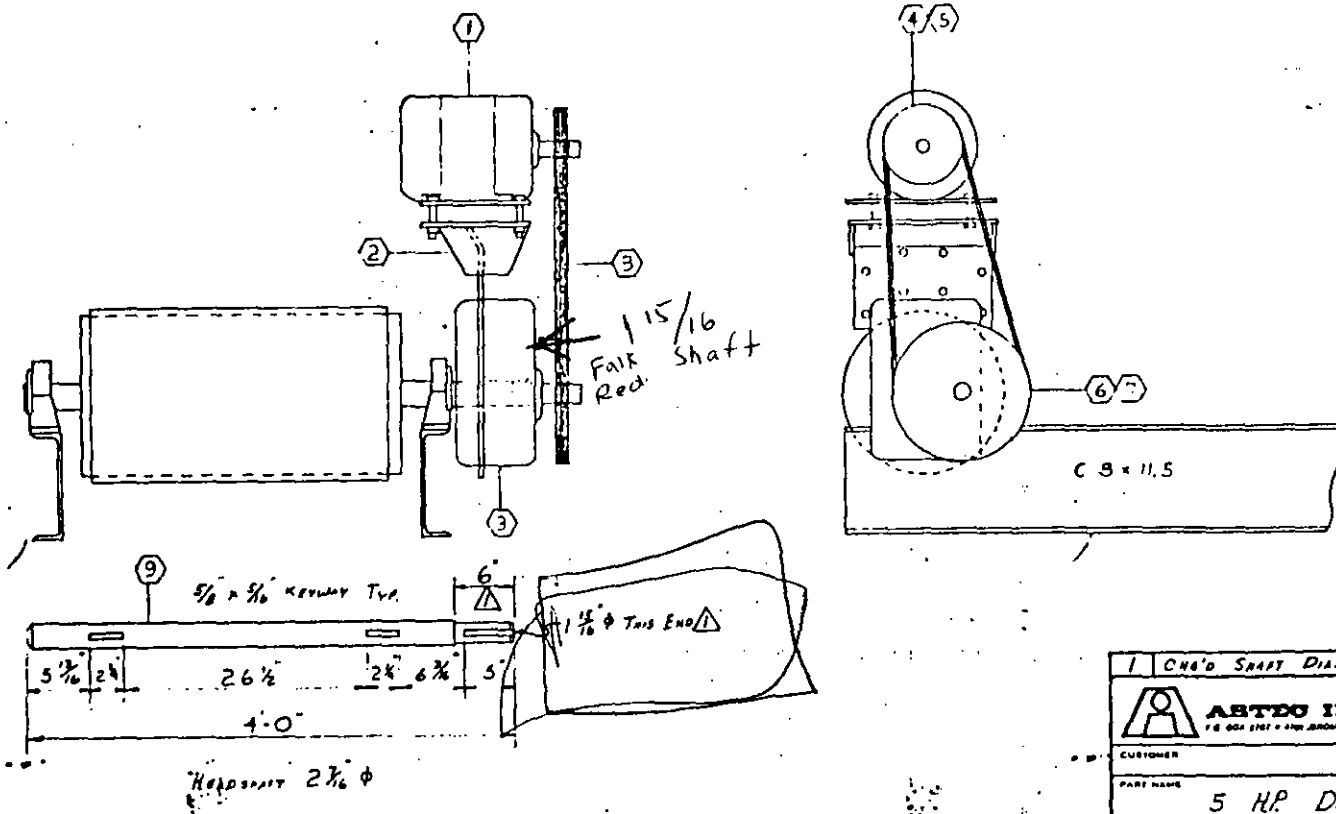
ALL DIMENSIONS UNLESS OTHERWISE NOTED ARE: PLUS OR MINUS
DIMENSIONS .010" - DIMENSIONAL TOLERANCE 1/16" - ALL OTHERS 1/32" NON ACCUMULATIVE
THIS DRAWING AND THE BLANKS SHOWING THEREIN IS THE PROPERTY OF ASTEC
INDUSTRIES, INC. AND HAS OR SHALL REMAIN THE PROPERTY OF ASTEC


REV 1	CHG'D MOTOR SHAFT FROM SVS 6	1/28	CC
 ASTEC INDUSTRIES, INC. P.O. BOX 2187 • 4011 ARCADE AVENUE • CHATTANOOGA, TENNESSEE 37407			
CUSTOMER			
PART NAME 10 HP DRIVE			
MACHINE 30° CONVEYOR			
DWG. NO.	CC	CHG'D	APPR.
JOB NO.	REV. NO.	SCALE	DWG. NO. CV-1077
			DATE: 1-20-85

674.33

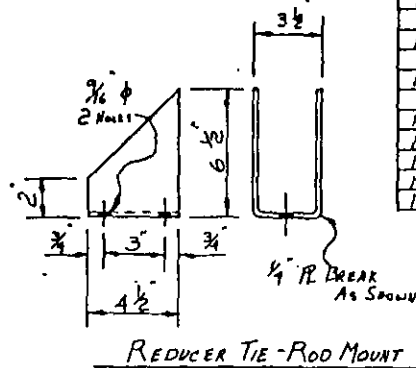
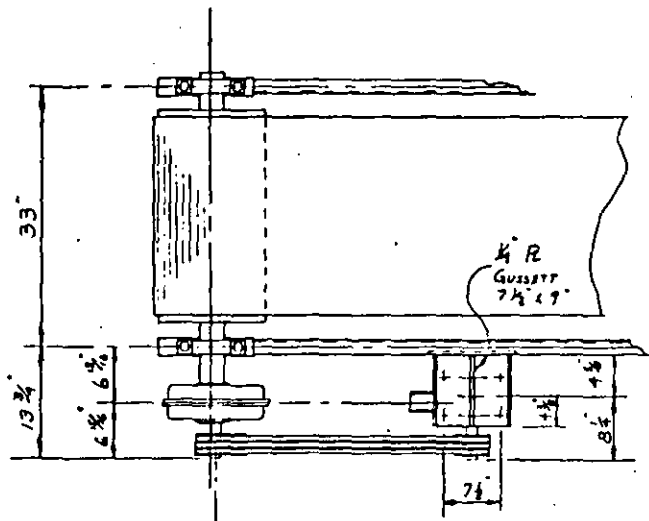
LIST OF COMPONENTS

ITEM	QTY	DESCRIPTION
1	1	5 HP-1500 RPM TEFC (187)
2	1	Fair Motor Mount - M215-1 (44)
3	1	Fair Shaft / Mount - Reducer - 211
		Rotation of Fair Motor 2115 JR 25
4	1	Motor Shaft - 3/4" A.12 - 2 3/4" L
5	1	Bushing "SN" - 1 1/4" Bore
6	1	Reducer Shaft 3/4" A.50 - 26 1/2" L
7	1	Bushing "SN" - 1 1/4" Bore
8	2	V-Belt Cog Type 3VX670 (Mars)
9	1	CRS 2 1/8" x C1018 1.0
10	1	Drive Guard Dia # CV-152 # 30

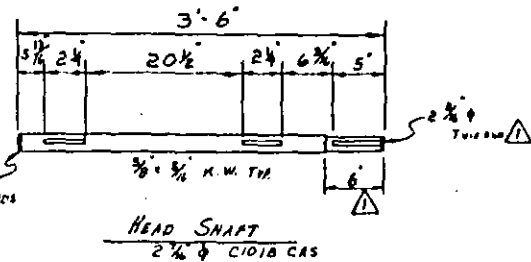
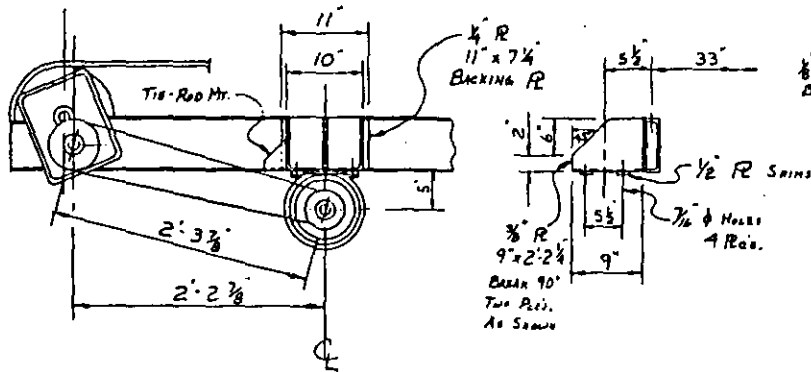


1 CHG'D SHAFT DIA.		DATE 10-11-51	
 ABTEC INDUSTRIES, INC. 18 001 2707 - 4TH AVENUE - CHATTANOOGA, TENN 37401			
CUSTOMER			
PART NAME			
5 HP DRIVE			
MACHINE			
30" CONVEYOR FINE PAPER			
DRW. NO.	REV.	DATE	DATE
100-1003		10-11-51	
APP. NO.	SCALE	DRW. NO.	REV.
		CV-1003	1

ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED ARE IN INCHES AND DECIMALS THEREOF.
 FINISHES: 1/16" - STRUCTURAL STEEL 1/32" - ALL OTHERS 1/32" UNLESS OTHERWISE SPECIFIED.
 THIS DRAWING AND THE REPRODUCED THEREFROM ARE THE PROPERTY OF ABTEC INDUSTRIES, INC. AND ARE TO BE KEPT IN CONFIDENCE AND NOT TO BE REPRODUCED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF ABTEC INDUSTRIES, INC.




REDUCER TIE-ROD MOUNT

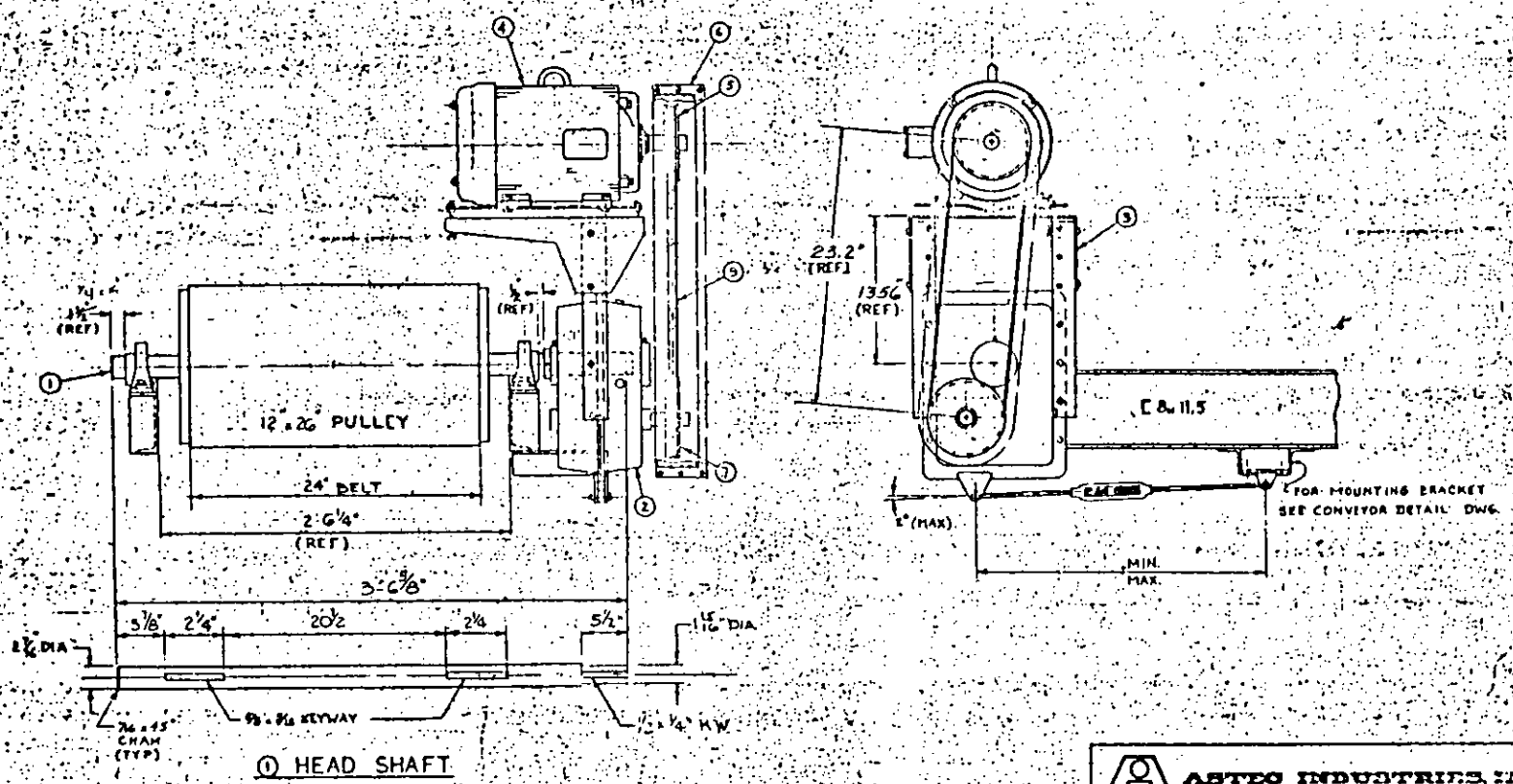


HEAD SHAFT
2 1/2 ϕ C1018 CAS

LIST OF COMPONENTS		
ITEM	QUAN	DESCRIPTION
1	1	5 HP-1800 RPM TERC (194T)
2	1	FALK SPART MOUNT REDUCER - CW ROTATION "HORIZONTAL" 2203 JARS
3	1	MOTOR SPRING 3V 3.15 - 3 GARS
4	1	GUSHING 5H 1 1/2" DIA
5	1	REDUCER 2-2 1/2" DIA 1/2" S. 3 SHAFT
6	1	GUSHING 353 1 1/2" DIA
7	3	V-BELTS 1/2" TYPE 3/1670 (HATS) 2203
8	1	CRS 2 1/2" 9 C1018 3' 6" LG
9	1	DRIVE GEAR DIA # CV-52 #19
10	1	12" x 2 1/2" LARGEST HEAD GEAR 7.423
11	56	FOR 2 1/2" SHIMS GEORGIN FERRAR H. 2 P. 24" CONV 2017 1/2" x 1/2" CARRAS
12	1	SHIMS 1/2" R 2 1/2"
13	1	3/2" R 2 1/2" 50 FT MOTOR MT.
14	1	1/2" R 4 1/2" x 1 1/2" TIE ROD MT.
15	1	1/4" R 7 1/2" x 9" SUBST
16	1	1/4" R 7 1/2" x 11" BACKING R


2	CHG'D BELTS FROM 5VX710	CC	3-14-82
1	CHG'D SHAFT DIA	PER	10-4-82
 ASTEC INDUSTRIES, INC. P.O. BOX 2187 • 4100 JEROME AVENUE • CHATTANOOGA, TENNESSEE 37407			
CUSTOMER			
PART NAME INCLINE RETURN CONV. DRIVE			
5 HP 1800 RPM 24" CONV.			
MACHINE RECYCLE CRUSHER			
DWG NO	REV	SCALE	DWG NO
32-056			CV-1005
DATE 7-28-82			REV 2

TOLERANCES ON DIMENSIONS UNLESS OTHERWISE NOTED ARE: PLUS OR MINUS
 FRACTIONS .010" - STRUCTURAL STEEL 1/16" - ALL OTHERS 1/32" FOR ACCUMULATIVE
 DIMENSIONS AND THE DIMENSIONS SHOWN THEREIN IS THE PROPERTY OF ASTEC
 INDUSTRIES, INC. AND USE OF COPIES THEREOF WITHOUT THE WRITTEN CONSENT



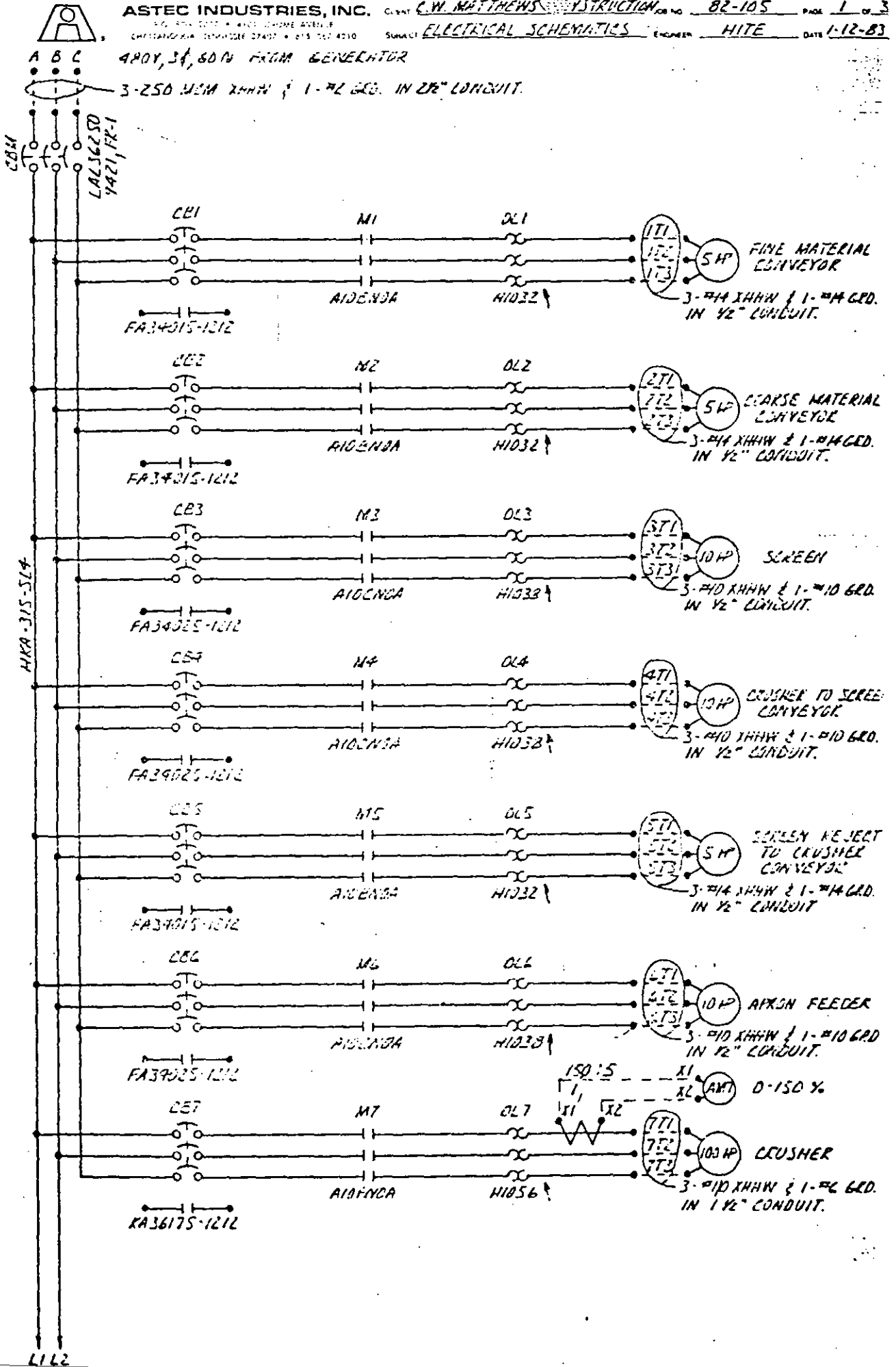
ITEM QTY	DESCRIPTION	SIZE	REMARKS
1	1	HEAD SHAFT 2 1/4 ϕ CRS	
2	1	DRIVE, SHAFT MOUNTED	FALK CORP 2115J R25
3	1	MOTOR MOUNT, (POS-NEG)	FALK CORP M2115-1
4	1	MOTOR, 130/160/2140, 1800RPM	TEFC, FRAME-107W, COLDA
5	2	SHEAVE ϕ MOTOR 2 GROOVE	3V4, 12 FB WOODS & SONS CO
6	1	DRIVE GUARD	CV-1045-H4
7	1	REDUCER SHEAVE 2 GROOVE	3V4-50
8	2	SHEAVE BUSHING SH	1 1/4 BORE
9	2	CO. TYPIC V BELT 3VK600	MATCHED

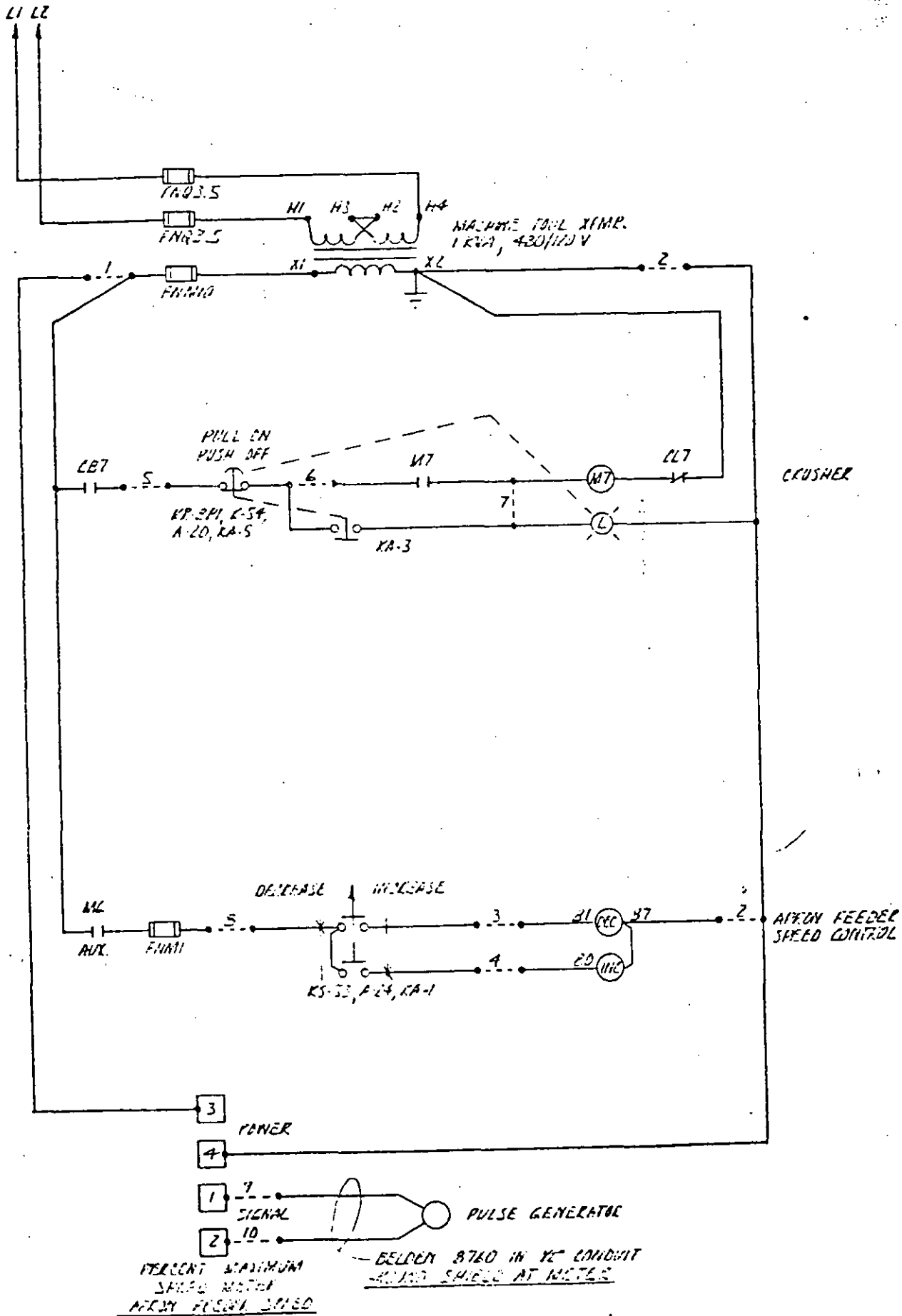
① HEAD SHAFT

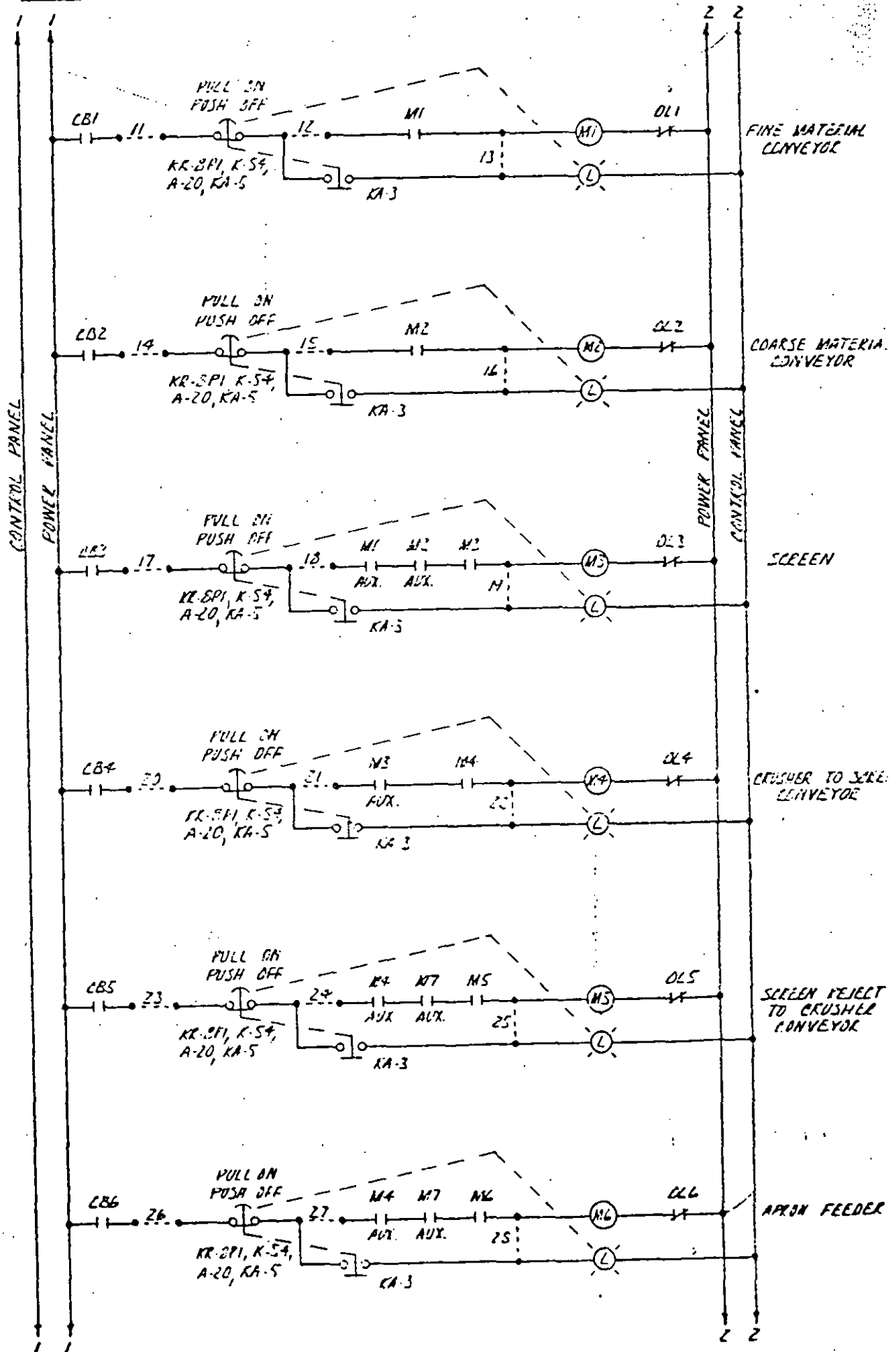

ASTEC INDUSTRIES, INC
 P.O. BOX 2197 • 1401 S. RAYNE AVENUE • CHATTANOOGA, TENNESSEE 37420
 CUSTOMER: _____
 PART NAME: CONVEYOR DRIVE ASSEMBLY HP
 MACHINE: 12 1/2 BELT CONVEYOR
 DATE: _____
CV-1053

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED. (PLEASE SEE DRAWING FOR TOLERANCES)
 1. THIS DRAWING IS THE PROPERTY OF ASTEC INDUSTRIES, INC. IT IS TO BE KEPT IN CONFIDENCE.
 2. ANY REVISIONS TO THIS DRAWING SHALL BE MADE BY A DRAWING ENGINEER AND APPROVED BY AN AUTHORIZED REPRESENTATIVE.
 3. DATE OF THIS DRAWING CHANGE: _____









BILL OF MATERIAL — PURCHASE PARTS

B/M REVISED _____

JOB NO. 82-105 PAGE 1 OF _____

B/M REVISED _____

CUSTOMER C.W. MATTHEWS CONST. CO.

B/M REVISED _____

PREPARED BY W. RISKE DATE 5-JAN-83

DATE MATL REQUIRED OUR PLANT _____

BY: _____

PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	DATE REC'D
		<u>TRANSPORT EQUIPMENT FOR RECYCLE CRUSHING PLANT.</u>			
001073	3	STANDARD FORGE & AXLE - CO 5" O.D., 20,000* CAP, 1-CAMS FOR DAYTON TYPE WHEELS			
006068	3	SETS RIDEWELL AIR SUSPENSION KIT *RAR-221-11-USW			
006066	1	RIDEWELL AIR CONTROL KIT SK-112C			
006057	12	10.00x20 STD TRAILER TIRE WITH TUBE & FLAP			
006059	12	10.00x20 DAYTON TYPE RIM.			
006067	2	TAILLAMP #3710			
006064	2	GLADHANDS #1202C			
004093	1	AIR VALVE KIT *KN 30010			
003149	1	5th WHEEL PIN #L345			
006065	1	AIR TANK *KN 60010			
SHOP MADE	1	PAIR MUD FLAPS 24" x 30"			
		<u>FRAME SUPPORT</u>			
007500	10	CONCRETE FORMS. CORP-GIMBAL TYPE ADJ PAD 2" ACME THREAD - 9" LONG WITH / 6" x 6" SQUARE BASE - 3/4" THICK 2" ROUND - ACME NUT.			

BILL OF MATERIAL — PURCHASE PARTS

B/M REVISED _____

JOB NO. 82-105 PAGE 2 OF _____

B/M REVISED _____

CUSTOMER C.W. MATTHEWS CONST CO

B/M REVISED _____

PREPARED BY W. RISKE DATE 5-JAN-83

DATE MATL REQUIRED OUR PLANT _____

BY: _____

PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	DATE REC'D
<u>INCLINE FINE PRODUCT CONVEYOR DRIVE & MOTOR</u>					
000375	1	FALK SHAFT MOUNTED REDUCER 2115 JR 25 WITH/BACKSTOP - CW ROTATION.			
003014	1	FALK MOTOR MOUNT M 2115-1 (ALL)			
003577	1	MOTOR SHEAVE 3V4.12 - 2 GROOVE			
001894	1	BUSHING "SH" - 1/8" BORE			
005078	1	REDUCER SHEAVE 3V4.50 - 2 GROOVE			
001894	1	BUSHING "SH" - 1/8" BORE			
001666	2	COG TYPE V-BELT 3V X 670 (MATCHED)			
002980	1	5 HP - 1800 RPM TEFC (184T) ELECTRIC MOTOR.			
<u>INCLINE COURSE PRODUCT CONVEYOR DRIVE & MOTOR</u>					
000375	1	FALK SHAFT MOUNTED REDUCER 2115 JR 25 WITH/BACKSTOP - CW ROTATION.			
003014	1	FALK MOTOR MOUNT M 2115-1 (ALL)			
003577	1	MOTOR SHEAVE 3V4.12 - 2 GROOVE			
001894	1	BUSHING "SH" - 1/8" BORE			
005078	1	REDUCER SHEAVE 3V4.50 - 2 GROOVE			
001894	1	BUSHING "SH" - 1/8" BORE			
002801	2	COG TYPE V-BELT 3V X 600 (MATCHED)			
002980	1	5 HP - 1800 RPM TEFC (184T) ELECTRIC MOTOR.			

BILL OF MATERIAL — PURCHASE PARTS

B/M REVISED 24-FEB-83 W/Jan.

JOB NO. 82-105 PAGE 3 OF

B/M REVISED

CUSTOMER C.W. MATTHEWS CONST CO

B/M REVISED

PREPARED BY W. RISKE DATE: 5-JAN-83

DATE MATL REQUIRED OUR PLANT BY: PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MATL AVAIL.	P.O. NO.	DA RE!
<u>INCLINE SCREEN FEED CONVEYOR DRIVE & MOTOR</u>					
	1	FALK SHAFT MOUNTED REDUCER 2207 JR 25 WITH/BACKSTOP - CW ROTATION.			
	1	FALK MOTOR MOUNT M 2207-1 (DJK)			
	1	MOTOR SHEAVE 3V 6.00 - 3 GROOVE			
	1	BUSHING SDS - 1 3/8" BORE			
	1	REDUCER SHEAVE 3V 8.00 - 3 GROOVE			
	1	BUSHING "SK" -- 1 1/2" BORE			
	3	V-BELTS - 3V 8 00 (MATCHED)			
	1	10HP-1800 RPM TEFC (215T) ELECTRIC MOTOR.			
<u>INCLINE RETURN CONVEYOR DRIVE & MOTOR</u>					
	1	FALK SHAFT MOUNTED REDUCER 2203 JR 25 WITH/BACKSTOP - CCW ROTATION.			
	1	MOTOR SHEAVE 3V 3.15 - 3 GROOVE			
	1	BUSHING "SH" - 1 1/8" BORE			
	1	REDUCER SHEAVE 3V 6.5 - 3 GROOVE			
	1	BUSHING "SDS" - 1 3/8" BORE			
001971	3	COG TYPE V-BELT 3V X ⁶⁷⁰ 225 (MATCHED)			
001666	3	3V X 670			
	1	5HP-1800 RPM TEFC (184T) ELECTRIC MOTOR			

BILL OF MATERIAL — PURCHASE PARTS

B/M REVISED _____
 B/M REVISED _____
 B/M REVISED _____

JOB NO. 82-105 PAGE 3 OF _____
 CUSTOMER C.W. MATTHEWS CONEY CO
 PREPARED BY W. RISKE DATE 5 JAN-83

DATE MATL REQUIRED OUR PLANT _____ BY: _____ PROD. CONTROL DEPT. _____

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	DAT REC'
<u>INCLINE SCREEN FEED CONVEYOR DRIVE & MOTOR</u>					
001882	1	FALK SHAFT MOUNTED REDUCER 2207 JR 25 WITH/BACKSTOP - CW ROTATION.			
003016	1	FALK MOTOR MOUNT M 2207-1 (DSL)			
003602	1	MOTOR SHEAVE 3V 6.00 - 3 GROOVE			
005427	1	BUSHING SDS - 1 3/8" BORE			
003603	1	REDUCER SHEAVE 3V 8.00 - 3 GROOVE			
001902	1	BUSHING "SK" -- 1 1/2" BORE			
001535	3	V-BELTS - 3V 8 00 (MATCHED)			
002983	1	10HP-1800 RPM TEFC (21ST) ELECTRIC MOTOR.			
<u>INCLINE RETURN CONVEYOR DRIVE & MOTOR</u>					
003282	1	FALK SHAFT MOUNTED REDUCER 2203JR25 WITH/BACKSTOP - CCW ROTATION.			
003594	1	MOTOR SHEAVE 3V 3.15 - 3 GROOVE.			
001894	1	BUSHING "SH" - 1/8" BORE			
005085	1	REDUCER SHEAVE 3V 6.5 - 3 GROOVE			
005427	1	BUSHING "SDS" - 1 3/8" BORE			
NEW 001666	3	CUG TYPE V-BELT 3V X-710 ⁶⁷⁰ (MATCHED)			
002980	1	5HP-1800 RPM TEFC (184T) ELECTRIC MOTOR			

BILL OF MATERIAL — PURCHASE POINTS

BM REVISED 31-MARCH-83 WJA JOB NO. 82-105 PAGE 4 OF
 BM REVISED CUSTOMER C.V. MATTHEWS CONST CO
 BM REVISED PREPARED BY W. RISKE DATE 5-JAN-83

DATE MAT'L REQUIRED OUR PLANT BY: PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	DATE REC'D
INCLINE RETURN CONVEYOR (24")					
1		LAGGED HEAD PULLEY 12' x 26" WITH/HUBS FOR 2 7/16" BUSHINGS			
2		BUSHING - 2 7/16" BORE			
1		SLAT TYPE TAIL PULLEY 12' x 26" WITH/HUBS FOR 1 5/16" BORE			
2		BUSHING - 1 5/16" BORE			
2		BROWNING PILLOW BLOCK PB 250 - 2 7/16" BORE			
2		BROWNING PILLOW BLOCK PB 250 - 1 5/16" BORE			
3		TRANSALL TROUGHING IDLER "B" SERIES # B 420 - 24T			
5		TRANSALL TROUGHING IDLER "B" SERIES # B 435 - 24T			
3		TRANSALL RETURN IDLER "B" SERIES # B 400 - 24R			
6		RETURN IDLER BRACKET 1 5/8" HIGH			
56 ^{RS}		GOODRICH FLEXSEAL "H" - 2 PLY 24' CONVEYOR BELT, 3/16" & 4/16" LOVERS			
<u>SAFETY SHIELD</u>					
003494	1	LAMINATED 1/4" THICK SAFETY GLASS 27 1/2" x 45 1/2"		PE 7611	

BILL OF MATERIAL — PURCHASE PARTS

B/M REVISED _____

JOB NO. 82-105 PAGE 4 OF _____

B/M REVISED _____

CUSTOMER C.V. MATTHEWS CONST CO

B/M REVISED _____

PREPARED BY W. RISKE DATE 5-JAN-83

DATE MATL REQUIRED OUR PLANT _____

BY: _____

PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	DATE REC'D
		INCLINE RETURN CONVEYOR (24")			
003178	1	LAGGED HEAD PULLEY 12" x 26" WITH HUBS FOR 2 7/16" BUSHINGS			
001888	2	BUSHING SF 2 7/16" BORE			
003203	1	SLAT TYPE TAIL PULLEY 12" x 26" WITH HUBS FOR 1 5/16" BORE			
001884	2	BUSHING SF 1 5/16" BORE			
008967	2	BROWNING PILLOW BLOCK PB 250 - 2 7/16" BORE			
000207	2	BROWNING PILLOW BLOCK PB 250 - 1 5/16" BORE			
002644	3	TRANSALL TROUGHING IDLER "B" SERIES # B 420 - 24T			
002649	5	TRANSALL TROUGHING IDLER "B" SERIES # B 435 - 24T			
002654	3	TRANSALL RETURN IDLER "B" SERIES # B 400 - 24R			
001792	6	RETURN IDLER BRACKET 1 5/8" HIGH			
001986	56	GOODRICH FLEXSEAL "H" 2 PLY 24' CONVEYOR BELT, 3/16" & 1/16" LAYERS			

BILL OF MATERIAL — PURCHASE PARTS

 B/M REVISED 24-FEB-83 WYAA

 JOB NO. 82-105 PAGE 5 OF

 B/M REVISED 16-MARCH-83 WYAA

 CUSTOMER C.W. MATTHEWS CONST CO

 B/M REVISED

 PREPARED BY W. RISKE DATE 5-JAN-83

 DATE MATL REQUIRED OUR PLANT BY: PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	DATE REC'D
		<u>Incline Fine Product Conveyor (30")</u>			
	1	Lagged Head Pulley 12" x 32" with hubs for 2 7/16" bushings.			
	2	Bushing - 2 7/16" bore			
	1	Slat Type Tail Pulley 12" x 32" with hubs for 1 5/16" bushings			
	2	Bushing - 1 5/16" bore			
	2	Browning Pillow Block PB 250 - 2 7/16" bore			
	2	Browning Pillow Block PB 250 - 1 5/16" bore			
	8	Transall Troughing Idler "B" Series # B 420-30T			
	2	Transall Return Idler "B" Series # B 400-30R			
	4	Return Idler Bracket - 1 5/8" high			
	50	FE - 30" Conveyor Belt			
		<u>40" CRUSHER TOP ROLL BITS</u>			
	76	003382 Mining Tools - Construction Bit Type "RB" Bit, Series 47			
	1	Mining Tools - Series 47 Bit Puller			

BILL OF MATERIAL - PURCHASE PARTS

BM REVISED 24-FEB-83 VJA

JOB NO. 82-100 PAGE 5 OF 5

BM REVISED _____

CUSTOMER C.W. MATTHEWS CONST CO

BM REVISED _____

PREPARED BY W. RISKE DATE 5-JAN-83

DATE MATL REQUIRED OUR PLANT _____ BY: _____ PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MATL AVAIL.	P.O. NO.	DA REC
		<u>INCLINE FINE PRODUCT CONVEYOR (30")</u>			
	1	LAGGED HEAD PULLEY 12" x 32" WITH HOLES FOR 2 7/16" BUSHINGS.			
	2	BUSHING - 2 7/16" BORE			
	1	SLAT TYPE TAIL PULLEY 12" x 32" WITH HOLES FOR 1 5/16" BUSHINGS			
	2	BUSHING - 1 5/16" BORE			
	2	BROWNING PILLOW BLOCK PB 250 - 2 7/16" BORE			
	2	BROWNING PILLOW BLOCK PB 250 - 1 5/16" BORE			
	8	TRANSALL TROUGHING IDLER "B" SERIES # B420-30T			
	2	TRANSALL RETURN IDLER "B" SERIES # B400-30R			
	4	RETURN IDLER BRACKET - 1 5/8" HIGH			
	50 FT	30" CONVEYOR BELT			
		<u>40" CRUSHER TOP ROLL BITS</u>			
<u>003382</u>	57	MINING TOOLS - CONSTRUCTION BIT TYPE "RB" BIT, SERIES 47			
<u>N/A</u>	1	MINING TOOLS. SERIES 47 BIT PULLER			

(Handwritten scribbles and marks on the left margin)

BILL OF MATERIAL — PURCHASE PARTS

B/M REVISED _____ JOB NO. 82-105 PAGE 5 OF _____

B/M REVISED _____ CUSTOMER C.W. MATTHEWS CONST CO

B/M REVISED _____ PREPARED BY W. RISK DATE 5-JAN-83

DATE MATL REQUIRED OUR PLANT _____ BY: _____ PROD. CONTROL DEPT. _____

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	DATE REC'D
		<u>INCLINE FINE PRODUCT CONVEYOR (30")</u>			
<u>003184</u>	<u>1</u>	<u>LAGGED HEAD PULLEY 12" x 32"</u> <u>WITH / HUBS FOR 2 7/16" BUSHINGS.</u>			
<u>001888</u>	<u>2</u>	<u>BUSHING SF - 2 7/16" BORE</u>			
<u>003197</u>	<u>1</u>	<u>SLAT TYPE TAIL PULLEY 12" x 32"</u> <u>WITH / HUBS FOR 1 15/16" BUSHINGS</u>			
<u>001884</u>	<u>24</u>	<u>BUSHING SF - 1 15/16" BORE</u>			
<u>008967</u>	<u>2</u>	<u>BROWNING PILLOW BLOCK PB 250 - 2 7/16" BORE</u>			
<u>000207</u>	<u>2</u>	<u>BROWNING PILLOW BLOCK PB 250 - 1 15/16" BORE</u>			
<u>002646</u>	<u>8</u>	<u>TRANSALL TROUGHING IDLER "B" SERIES</u> <u>* B 420-30T</u>			
<u>002655</u>	<u>2</u>	<u>TRANSALL RETURN IDLER "B" SERIES</u> <u># B 400-30R</u>			
<u>001792</u>	<u>4</u>	<u>RETURN IDLER BRACKET - 1 7/8" HIGH</u>			
<u>001513</u>	<u>50</u>	<u>FE - 30" CONVEYOR BELT</u>			

BILL OF MATERIAL — PURCHASE ORDER

B/M REVISED 31-MARCH-83 WJM : JOB NO. 82-105 PAGE 6 OF
 B/M REVISED : CUSTOMER C. W. MATTHEWS CONST CO
 B/M REVISED : PREPARED BY W. RISKE DATE 5-JAN-83

DATE MAT'L REQUIRED OUR PLANT BY: PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	DATE REC'D
		<u>INCLINE COURSE PRODUCT CONVEYOR (24')</u>			
	<u>1</u>	<u>LAGGED HEAD 12" x 26"</u> <u>WITH / HUBS FOR 2 7/16" BUSHINGS.</u>			
	<u>2</u>	<u>BUSHING - 2 7/16" BORE</u>			
	<u>2</u>	<u>BROWNING PLOW BLOCK. PB250-2 7/16" BORE</u>			
	<u>4</u>	<u>TRANSALL TROUGHING IDLER "B" SERIES</u> <u>* B 420-24T</u>			
	<u>3</u>	<u>TRANSALL TROUGHING IDLER "B" SERIES</u> <u>* B 435-24T</u>			
	<u>3</u>	<u>TRANSALL RETURN IDLER "B" SERIES</u> <u>* B 400-24R</u>			
	<u>6</u>	<u>RETURN IDLER BRACKET - 1 7/8" HIGH</u>			
	<u>50 FT</u>	<u>- 24" CONVEYOR BELT.</u>			
	<u>1</u>	<u>SLAT TYPE TAIL PULLEY 12" x 26'</u> <u>WITH / HUBS FOR 1 15/16" BORE</u>			
	<u>2</u>	<u>BUSHING. - 1 15/16" BORE</u>			
		<u>EXTRA TOP ROLL BITS</u>			
<u>003382</u>	<u>76</u>	<u>MINING TOOLS - CONSTRUCTION BIT.</u> <u>TYPE "RR" BIT - SERIES 47</u>			
		<u>NOTE: THESE TO GO IN TOOL BOX</u>			

BILL OF MATERIAL — PURCHASE PARTS

BM REVISED _____ JOB NO. 82-105 PAGE 7 OF _____
 BM REVISED _____ CUSTOMER C.W. MATTHEWS CONST. CO.
 BM REVISED _____ PREPARED BY W. RISKE DATE 5-JAN-83

DATE MAT'L REQUIRED OUR PLANT _____ BY: _____ PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	DATE REC'D
		<u>SCREEN & MOTOR</u>			
001741	1	<u>DEISTER INCLINE SCREEN — SPECIAL</u> <u>MODEL USM-241D-A (SPECIAL)</u> <u>4 FT. X 10 FT. — 2 DECK</u> <u>TO DEISTER MACHINE DWG. # 11321</u> <u>SET UP AT 18° SLOPE</u> <u>16" FEED BOX</u> <u>DRIVE, GUARD & MOTOR BASE MOUNTED</u> <u>DRIVE ON LEFT HAND SIDE</u> <u>FLYWHEEL GUARDS.</u> <u>CHANNEL BASE</u> <u>OVERSIZE CNOTE EXTENDED FROM TOP DECK.</u> <u>WITH / LEFT HAND DISCHARGE</u> <u>20" WIDE DISCHARGE — LIP 8" FROM</u> <u>SIDE PLATE</u> <u>REMOVABLE CHANNEL ON FEED BOX END.</u> <u>FOR BOTTOM DECK CLOTH REMOVAL.</u> <u>BOTTOM DECK DISCHARGE LIP TO HAVE 5"</u> <u>REMOVABLE KICKER PLATE ON EACH END.</u> <u>(MAKING DISCHARGE WIDTH 3' 2")</u> <u>EXTENDED SIDE PLATES TO FORM BOTTOM</u> <u>HOPPER FOR 24" WIDE DISCHARGE</u> <u>TOP DECK — 1/2" SQ DRG X .3125 WIRE, BOTTOM DECK 5/8" SQ DRG X .177 WIRE</u> <u>LESS: ELECTRIC MOTOR.</u> <u>NOTE: ASTEC WILL SUPPLY & MOUNT 10HP-1800 RPM.</u> <u>(21ST) ELECTRIC MOTOR.</u>			
002983	1	<u>10HP-1800 RPM TEFC (21ST)</u> <u>ELECTRIC MOTOR</u>			

BILL OF MATERIAL — PURCHASE PARTS

B/M REVISED 14-JAN-83 WYAN

JOB NO. 82-105 PAGE 8 F.

B/M REVISED _____

CUSTOMER C.W. MATTHEWS CONST CO

B/M REVISED _____

PREPARED BY W. RISKE DATE 5-JAN-83

DATE MAT'L REQUIRED OUR PLANT _____ BY: _____ PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	C R
		<u>APRON FEEDER COMPONENTS</u>			
		<u>102[#] (204 PITCHES) JEFFREY APRON CONVEYOR CHAIN</u>			
		<u>#1258 STR (6" PITCH)</u>			
		<u>D 2 1/2" ATTACHMENT</u>			
		<u>WITH 4" HIGH ENDS</u>			
		<u>FLANGED ROLLER</u>			
		<u>2 JEFFREY SPROCKET - 6 TOOTH, FOR 1258 CHAIN</u>			
		<u>3 15/16" BORE, C1 - CHILLED RIM.</u>			
		<u>WITH HUB 7 1/4" DIA. - 5" LONG</u>			
		<u>ALLOWABLE CHAIN PULL 7200[#]</u>			
		<u>STD. KEYWAY W/ SET SCREWS</u>			
		<u>2 JEFFREY SPROCKET - 6 TOOTH, FOR 1258 CHAIN</u>			
		<u>2 15/16" BORE, C1 - CHILLED RIM</u>			
		<u>WITH HUB 6" DIA - 4 1/4" LONG.</u>			
		<u>ALLOWABLE CHAIN PULL 7200[#]</u>			
		<u>STD. KEYWAY W/ SET SCREWS</u>			
<u>003061</u>	<u>2</u>	<u>#MEP-63</u>			
<u>002264</u>	<u>2</u>	<u>SEALMASTER PILLOW BLOCK MSFPD-47</u>			
		<u>3 15/16" BORE</u>			
		<u>2 SEALMASTER PILLOW BLOCK [#]MSFPD-47</u>			
		<u>2 15/16" BORE</u>			
		<u>2 CHAIN OILER 1/2 GAL SIZE</u>			

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BILL OF MATERIAL — PURCHASE PARTS

B/M REVISED _____

JOB NO. 82-105 PAGE 8 F. _____

B/M REVISED _____

CUSTOMER C.W. MATTHEWS CONST CO.

B/M REVISED _____

PREPARED BY W. Riske DATE 5-JAN-83

DATE MAT'L REQUIRED OUR PLANT _____

BY: _____

PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	DATE REC'D
		<u>APRON FEEDER COMPONENTS</u>			
<u>001934</u>	<u>102[#]</u>	<u>(204 PITCHES) JEFFREY APRON CONVEYOR CHAIN</u> <u>#1258 STR (6" PITCH)</u> <u>D 2 1/2" ATTACHMENT</u> <u>WITH 4" HIGH ENDS</u> <u>FLANGED ROLLER</u>			
<u>001940</u>	<u>2</u>	<u>JEFFREY SPROCKET - 6 TOOTH, FOR 1258 CHAIN</u> <u>3 15/16" BORE, C1 - CHILLED RIM.</u> <u>WITH HUB 7 1/4" DIA. - 5" LONG</u> <u>ALLOWABLE CHAIN PULL 7200[#]</u> <u>STD. KEYWAY w/ SET SCREWS</u>			
<u>001944</u>	<u>2</u>	<u>JEFFREY SPROCKET - 6 TOOTH, FOR 1258 CHAIN</u> <u>2 15/16" BORE, C1 - CHILLED RIM</u> <u>WITH HUB 6" DIA - 4 1/4" LONG</u> <u>ALLOWABLE CHAIN PULL 7200[#]</u> <u>STD. KEYWAY w/ SET SCREWS</u>			
<u>003061</u>					
<u>002264</u>	<u>2</u>	<u>SEALMASTER PILLOW BLOCK # MAFSD - 63</u> <u>3 15/16" BORE</u>			
<u>002265</u>	<u>2</u>	<u>SEALMASTER PILLOW BLOCK # MSFPD - 47</u> <u>2 15/16" BORE</u>			
<u>007871</u>	<u>2</u>	<u>CHAIN OILER 1/2 GAL SIZE</u>			

BILL OF MATERIAL — PURCHASE POINTS

B.M. REVISED _____
 B.M. REVISED _____
 B.M. REVISED _____

JOB NO. 82-105 PAGE 9 F
 CUSTOMER C.W. MATTHEWS CONST CO
 PREPARED BY W. RISK F DATE 5-JAN-83

DATE MATL REQUIRED OUR PLANT _____ BY: _____ PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	DATE REC'D
		<u>APRON FEEDER DRIVE & MOTOR</u>			
<u>003024</u>	<u>1</u>	<u>10 HP - U.S. VARIDRIVE MOTOR.</u>			
		<u>SIZE 25 - SUPER STANDARD #6195</u>			
		<u>ELECTRIC REMOTE CONTROL TYPE ERR</u>			
		<u>REMOTE SPEED INDICATOR TYPE ERS1</u>			
		<u>WITH MAX. SPEED 732 RPM</u>			
		<u>MIN SPEED 92 RPM</u>			
		<u>FRAME 25-215T, TYPE VEU-TF-GH</u>			
		<u>ASSEMBLY - Z-1A</u>			
<u>001933</u>	<u>12</u>	<u>FALK SHAFT MOUNTED REDUCER.</u>			
		<u>#3315 JR-25</u>			
<u>003622</u>	<u>1</u>	<u>MOTOR SHEAVE 5V 7.10 - 5 GROOVE</u>			
<u>005440</u>	<u>1</u>	<u>BUSHING "SF" - 1 3/4" BORE</u>			
<u>005109</u>	<u>1</u>	<u>REDUCER SHEAVE 5V9.0 - 5 GROOVE</u>			
<u>005396</u>	<u>1</u>	<u>BUSHING "E" - 2 1/4" BORE</u>			
<u>003031</u>	<u>5</u>	<u>V-BELTS COG TYPE 5V X 800 (MATCHED)</u>			
		<u>FUEL TANK VALVES</u>			
<u>007001</u>	<u>1</u>	<u>1/2" GATE VALVE</u>			
<u>007403</u>	<u>1</u>	<u>1 1/2" GATE VALVE</u>			

BILL OF MATERIAL - PURCHASE PARTS

B/M REVISED _____
B/M REVISED _____
B/M REVISED _____

JOB NO. 82-105 PAGE 10 OF _____
CUSTOMER C. V. MATTHEWS CONST. CO
PREPARED BY W. RISKE DATE 6-JAN-83

DATE MATL REQUIRED OUR PLANT _____ BY: _____ PROD. CONTROL DEPT. _____

ASTEC ITEM NO.	QTY.	DESCRIPTION	MATL AVAIL.	P.O. NO.	DATE REC'D
		<u>INCLINE SCREEN CONVEYOR ("36")</u>			
<u>005226</u>	<u>1</u>	<u>LAGGED HEAD PULLEY 16" x 38"</u> <u>WITH/HUBS FOR 2 7/16" BUSHINGS.</u>			
<u>001888</u>	<u>2</u>	<u>BUSHINGS ^{SF} - 2 7/16" BORE</u>			
<u>008556</u>	<u>1</u>	<u>SLAT TYPE TAIL PULLEY 12" x 38"</u> <u>WITH/HUBS FOR 1 15/16" BUSHINGS</u>			
<u>001884</u>	<u>2</u>	<u>BUSHINGS ^{SF} - 1 15/16" BORE</u>			
<u>008967</u>	<u>2</u>	<u>BROWNING PILLOW BLOCK PB250 - 2 7/16" BORE</u>			
<u>000207</u>	<u>2</u>	<u>BROWNING PILLOW BLOCK. PB250 - 1 5/16" BORE</u>			
<u>003035</u>	<u>5</u>	<u>TRANSALL RUBBER DISC TROUGHING IDLER.</u> <u>"B" SERIES # B520-36 TI</u>			
<u>003036</u>	<u>7</u>	<u>TRANSALL TROUGHING IDLER "B" SERIES # B535-36T</u>			
<u>003037</u>	<u>3</u>	<u>TRANSALL TROUGHING IDLER "B" SERIES # B520-36T</u>			
<u>008736</u>	<u>4</u>	<u>TRANSALL RETURN IDLER "B" SERIES # B400-36R.</u>			
<u>001792</u>	<u>8</u>	<u>RETURN IDLER BRACKET - 1 5/8" HIGH.</u>			
<u>009637</u>	<u>85</u>	<u>GODDRICH FLEXSEAL "H" - 3 PLY</u> <u>36' CONVEYOR BELT - LONG LIFE COVERS 3/16" & 1/16"</u>			
		<u>CRUSHER</u>			
<u>002838</u>	<u>1</u>	<u>JEFFREY TRIPLE ROLL CRUSHER.</u> <u>MODEL 40 TR.</u> <u>LESS 100 HP DRIVE.</u>		<u>PE4763</u>	

BILL OF MATERIAL — PURCHASE POINTS

B/M REVISED _____
 B/M REVISED _____
 B/M REVISED _____

JOB NO. 82-105 PAGE 11 OF _____

CUSTOMER C.W. MATTHEWS CONST. CO

PREPARED BY W. Riske DATE 29-MARCH-83

DATE MAT'L REQUIRED OUR PLANT _____ BY: _____ PROD. CONTROL DEPT.

ASTEC ITEM NO.	QTY.	DESCRIPTION	MAT'L AVAIL.	P.O. NO.	DATE REC'D
		<u>CRUSHER DRIVE & MOTOR</u>			
		<u>N/A 1/100 HP DRIVE FOR 40TR CRUSHER.</u>		<u>PE4763</u>	
		<u>AS FOLLOWS:</u>			
		<u>1 - JEFFREY MOTOR BASE - REINFORCED</u>			
		<u>1 - CRIGHTON 1200 D SPEED REDUCER</u>			
		<u>WITH/ JEFFREY SHAFT MODIFICATION.</u>			
		<u>1 - TORQUE TEAM BVF 2800-12 BAND BELT</u> 8U2240			
		<u>2 - 8V 12.5 - 12 GROOVE SHEAVE</u>			
		<u>1 - 8V 4D - 12 GROOVE SHEAVE</u>			
		<u>1 - FALK 80T COUPLING</u>			
		<u>1 - "M" BUSHING 3 1/2" BORE</u>			
		<u>1 - "M" BUSHING 5 3/16" BORE</u>			
		<u>1 - "P" BUSHING 5 3/4" BORE</u>			
		<u>GUARDS AS REQ'D.</u>			
		<u>NOTE: ADDITIONAL ITEMS WERE</u>			
		<u>SUPPLIED BY JEFFREY</u>			
		<u>FOR JACK SHAFT ADDITION</u>			
		<u>1 - COUPLING.</u>			
		<u>1 - JACK SHAFT</u>			
		<u>2 - PILLOW BLOCKS.</u>			
		} <u>SIZES UNKNOWN</u>			
		<u>NOTE: 100 HP - 1800 RPM (409T) MOTOR.</u>			
		<u>IS TO BE MOUNTED BY ASTEC</u>			
		<u>100 HP - 1800 RPM. ODP ENCAPSULATED (409T)</u>			
		<u>ELECTRIC MOTOR</u>			

005353 1
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 DO NOT ALLOCATE



INCLINE CONVEYOR - FINE PRODUCT

PART -	DESCRIPTION	MANUFACTURER	NO. REQD.
REDUCER 00375	SHAFT MOUNTED BACKSTOP CW ROTATION 2115-JR-25	FALK	1
MOUNT 003014	MOTOR M-2115-1 A6L	FALK	1
MOTOR 002980	5 HP, 1800 RPM, TEFC, 184T FRAME ELECTRIC	LINCOLN	1
SHEAVE 003577	(MOTOR) 3V4.12 2 GROOVE	WOODS	1
BUSHINGS 001894	"SH" 1-1/8" BORE	WOODS	1
SHEAVE 005078	(REDUCER) 3V4.50 2 GROOVE	WOODS	1
BUSHINGS 001894	"SH" 1-1/8" BORE 1 1/4"	WOODS	1
V-BELTS 001666	COG TYPE MATCHED 3VX670	RICHARDSON	2
PULLEY 003184	LAGGED HEAD 12" x 32"	PULLCO	1
BUSHING 001888	2-7/16" BORE	PULLCO	2
PULLEY 003197	SLAT TYPE TAIL 12" x 32"	PULLCO	1
BUSHINGS 001884	1-15/16" BORE	PULLCO	2
BEARING 008967	PILLOW BLOCK PB-250 2-7/16" BORE	BROWNING	2
BEARING 000207	PILLOW BLOCK PB-250 1-15/16" BORE	BROWNING	2
IDLER 002646	TROUGHING SERIES "B" #B420-30T	TRANSALL	8
IDLER 002655	RETURN SERIES "B" #B400-30R	TRANSALL	2
BRACKET 001792	1-5/8" HIGH ON RETURN IDLERS	TRANSALL	4



ASTEC INDUSTRIES, INC.

P.O. BOX 2787 • 4101 JEROME AVENUE • CHATTANOOGA, TENNESSEE 37407 • 615-867-4210

INCLINE CONVEYOR - FINE PRODUCT CONT'D.

PART-	DESCRIPTION	MANUFACTURER	NO. REQ'D.
BELTING 001513	30" CONVEYOR	GOODRICH	50'



INCLINE CONVEYOR - COARSE PRODUCT

PART.	DESCRIPTION	MANUFACTURER	NO. REQ'D.
REDUCER 000375	SHAFT MOUNTED BACKSTOP CW ROTATION 2115-JR-25	FALK	1
MOTOR 002980	5 H.P., 1800 RPM, TEFC, 184T FRAME.	LINCOLN	1
MOUNT .003014	(MOTOR) M2115-1 A6M	FALK	1
SHEAVE 003577	(MOTOR) 3V4.12 2 GROOVE	WOODS	1
BUSHING 001894	"SH" 1-1/8" BORE	WOODS	1
SHEAVE 005078	(REDUCER) 3V4.50 2 GROOVE	WOODS	1
BUSHING 001894	"SH" 1-1/8" BORE	WOODS	1
V-BELTS 002801	COG TYPE MATCHED 3VX600	RICHARDSON	2
PULLEY 003178	LAGGED HEAD 12" x 26"	PULLCO	1
BUSHING 001888	2-7/16" BORE	PULLCO	2
PULLEY 003203	SLAT TYPE TAIL 12" x 26"	PULLCO	1
BUSHINGS 001884	1-15/16" BORE	PULLCO	2
BEARING 008967	PILLOW BLOCK PB-250 2-7/16" BORE	BROWNING	2
IDLER 002644	TROUGHING SERIES "B" #B420-24T	TRANSALL	4
IDLER 002654	RETURN SERIES "B" #B400-24R	TRANSALL	3
BRACKET 001792	1-5/8" HIGH FOR RETURN IDLER	TRANSALL	6
IDLER 002649	TROUGHING SERIES "B" #B435-24T	TRANSALL	3



ASTEC INDUSTRIES, INC.

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INCLINE RETURN CONVEYOR

PART	DESCRIPTION	MANUFACTURER	NO. REQ.
REDUCER 003282	SHAFT MOUNTED BACKSTOP CCW ROTATION 2203-JR-25	FALK	1
MOTOR 002980	5 HP, 1800 RPM, TEFC, 184T FRAME ELECTRIC	LINCOLN	1
SHEAVE 003594	(MOTOR) 3V3.15 3 GROOVE	WOODS	1
BUSHING 001894	"SH" 1-1/8" BORE	WOODS	1
SHEAVE 005085	(REDUCER) 3V6.5 3 GROOVE	WOODS	1
BUSHING 005427	"SDS" 1-3/8" BORE	WOODS	1
V-BELTS 001666	(MATCHED) COG TYPE 3VX670	MATCHED	3
PULLEY 003178	LAGGED HEAD 12" x 26"	PULLCO	1
BUSHINGS 001888	2-7/16" BORE	PULLCO	2
BEARING 008967	PILLOW BLOCK PB-250 2-7/16" BORE	BROWNING	2
PULLEY 003203	SLAT TYPE TAIL 12" x 26"	PULLCO	1
BUSHINGS 001884	1-15/16" BORE	PULLCO	2
BEARING 000207	PILLOW BLOCK PB-250 1-15/16" BORE	BROWNING	2
IDLER 002644	TROUGHING SERIES "B" #B420-24T	TRANSALL	3
IDLER 002649	TROUGHING SERIES "B" #B435-24T	TRANSALL	5
IDLER 002654	RETURN SERIES "B" #B400-24R	TRANSALL	3
BRACKET 001792	1-5/8" HIGH FOR RETURN IDLER	TRANSALL	6



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INCLINE RETURN CONVEYOR CONT'D.

PART	DESCRIPTION	MANUFACTURER	NO. REQ'D.
BELTING 001986	FLEXSEAL "H" 2 PLY 24" CONVEYOR 3/16" and 1/16" COVERS	GOODRICH	56'



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INCLINE CONVEYOR - SCREEN FEED

PART	DESCRIPTION	MANUFACTURER	NO. REQ'D.
REDUCER 001382	SHAFT-MOUNT BACKSTOP CW ROTATION #2207-JR-25	FALK	1
MOTOR MOUNT 003016	M2207-1 D 3 L	FALK	1
MOTOR 002983	10 HP, 1800 RPM, TEFC, ELECTRIC, 215T FRAME	LINCOLN	1
SHEAVE 003602	(MOTOR) 3V6.00 3 GROOVE	WOODS	1
BUSHING 005427	"SDS" 1-3/8" BORE	WOODS	1
SHEAVE 003603	(REDUCER) 3V8.00 3 GROOVE	WOODS	1
BUSHING 001902	"SK" 1-1/2" BORE	WOODS	1
V-BELTS 001535	(MATCHED) 3V800	RICHARDSON	3
PULLEY 005226	LAGGED HEAD 16" x 38"	PULLCO	1
BUSHING 001888	2-7/16" BORE	PULLCO	2
BEARING 008967	PB-250 2-7/16" BORE	BROWNING	2
PULLEY 008556	SLAT TYPE TAIL 12" x 38"	PULLCO	1
BUSHING 001884	1-15/16" BORE	PULLCO	2



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INCLINE CONVEYOR - SCREEN FEED

PART	DESCRIPTION	MANUFACTURER	NO. REQ'D.
BEARING 000207	PB-250 1-15/16" BORE	BROWNING	2
IDLER 003035	TROUGHING SERIES "B" #B520-36 TI RUBBER DISC. IMPAC	TRANSALL	5
IDLER 003037	TROUGHING SERIES "B" #B520-36T	TRANSALL	3
IDLER 003036	TROUGHING SERIES "B" #B535-36T	TRANSALL	7 8
IDLER 008736	RETURN SERIES "B" #B400-36R	TRANSALL	4
BRACKET 001792	1-5/8" HIGH FOR RETURN IDLER	TRANSALL	8
BELTING 009637	36" CONVEYOR FLEXSEAL "H" 3 PLY	GOODRICH	85'



SCREEN

PART	DESCRIPTION	MANUFACTURER	NO. REQD.
SCREEN 001741	USM-2410-A 4' x 10' 2 DECK DEISTER DRAWING NO. #11321 18 DEGREE SLOPE 16" FEED BOX DRIVE ASSEMBLY	DEISTER	1
WIRE CLOTH	TOP DECK - 1-1/2" SQUARE OPENING X .3125 WIRE BOTTOM DECK - 5/8" SQUARE OPENING X .177 WIRE		1 1
MOTOR 002983	10 H.P., 1800 RPM, TEFC, 215T FRAME ELECTRIC	LINCOLN	1



ASTEC INDUSTRIES, INC.

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APRON FEEDER

PART	DESCRIPTION	MANUFACTURER	NO. REQ'D.
CHAIN 001934	#1258 STR 204 PITCHES WITH D 2 1/2" ATTACHMENT 4" HIGH ENDS FLANGED ROLLER	JEFFREY	102'
PAN, APRON 001939	APRON FEEDER PAN #1258-28 STYLE A-1 3/8" THICK 28" LONG	ASTEC	102
SPROCKET 001940	6 TOOTH 3-15/16" BORE C-1 CHILLED RIM HUB 7-1/4" DIA. 5" LONG	JEFFREY	2
SPROCKET 001944	6 TOOTH 2-15/16" BORE C-1 CHILLED RIM HUB 6" DIA. 4-1/4" LONG	JEFFREY	2
BEARING 003061	PILLOW BLOCK 3-15/16" BORE #MFP-63	SEALMASTER	2
BEARING 002265	PILLOW BLOCK 2-15/16" BORE #MSFPD-47	SEALMASTER	2
OILER 007871	1/2 GALLON SIZE FOR CHAIN OILING		2
MOTOR 003024	10 HP, SIZE 25 SUPER STANDARD #6195 ELECTRIC REMOTE CONTROL TYPE ERR REMOTE SPEED INDICATOR TYPE ERSI FRAME 25-215 T TYPE VEU-TF-GH ASSEMBLY Z-1A	U. S. VARIDRIVE	1
REDUCER 001933	SHAFT MOUNTED #3315-JR-25	FALK	1
SHEAVE 003622	(MOTOR) 5V7.10 5 GROOVE	WOODS	1
BUSHING 005440	"SF" 1-3/4" BORE	WOODS	1
SHEAVE 005109	(REDUCER) 5V9.0 5 GROOVE	WOODS	1



AUSTIN INDUSTRIAL MILLS, INC.

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APRON FEEDER CONT'D.

PART	DESCRIPTION	MANUFACTURER	NO. REQ.
BUSHING 005396	"E" 2-1/4" BORE	WOODS	1
V-BELTS 003031	(MATCHED) COG TYPE 5VX800	EQUIVALENT	5



JEFFREY INDUSTRIAL EQUIPMENT, INC.

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JEFFREY CRUSHER

PART	DESCRIPTION	MANUFACTURER	NO. REQ'D.
CRUSHER 002838	MODEL 40 TR W/DRIVE COMPONENT AND MOTOR BASE	JEFFREY	1
MOTOR 005353	100 H.P. 1800 RPM 404T FRAME	LINCOLN	1
<p>* NOW HAVE A JEFFREY 54 ROLL A FLEX CRUSHER PER BRYAN AT C.W. MATHEWS</p>			
<p>Joe Gylem</p>			

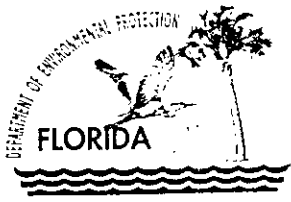


ASTEC INDUSTRIES, INC.

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FOR CRUSHER MOTOR MOUNTING

PART	DESCRIPTION	MANUFACTURER	NO. REQ'D.
BOLTS	GRADE "8" 8TPI x 5-1/2" LONG 1" DIA.		4
NUTS	GRADE "8" FOR ABOVE BOLTS		4
NUTS	SLOTTED NUTS 8TPI 1"		2



Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

August 13, 1997

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Ted McRae, President
Anderson Columbia, Inc.
P. O. Box 1829
Lake City, Florida 32056

Re: DRAFT Permit No. 7775042-001-AC
Mobile Crushing Unit

Dear Mr. McRae:

The Department has reviewed your application for permit to construct a mobile 200 TPH Astec Crushing Unit that was received on August 6, 1997. We need the additional information/clarification listed below to process this request.

1. Can this unit be operated in compliance with the visible emissions standards of 10 percent opacity for conveyors and 15 percent opacity for crushers specified in the new source performance standard (40 CFR 60, Subpart 000)?
2. Please provide an Operation and Maintenance plan for the crusher unit, including the water spray system used to control fugitive emissions.

The Department will resume processing this application after receipt of the requested information. If you have any questions on this matter, please call Willard Hanks at 850/488-1344.

Sincerely,

A. A. Linero, P.E.
Administrator
New Source Review Section

AAL/wh

cc: Mr. Frank Darabi, Darabi and Assoc.
Mr. Chris Kirts, NED

Is your RETURN ADDRESS completed on the reverse side?

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):

- Addressee's Address
- Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
 Mr. Jed McRae, Pres.
 Anderson Columbia
 PO Box 1829
 Lake City, FL
 32056

4a. Article Number
 P 265 659 252

4b. Service Type

Registered Certified
 Express Mail Insured
 Return Receipt for Merchandise COD

7. Date of Delivery
 8-18-97

5. Received By: (Print Name)
 Rhonda Strickland

8. Addressee's Address (Only if requested and fee is paid)

6. Signature: (Addressee or Agent)
 X

PS Form 384

Thank you for using Return Receipt Service.

P 265 659 252

US Postal Service
Receipt for Certified Mail
 No Insurance Coverage Provided.
 Do not use for International Mail (See reverse)

Sent to	Jed McRae
Street & Number	Anderson Columbia
Post Office, State, & ZIP Code	Lake City, FL
Postage	\$0
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	\$
Postmark or Date	8-13-97
	7775042-001-AC

PS Form 3800, April 1995

**DARABI
AND
ASSOCIATES, INC.**
Environmental Consultants

RECEIVED

AUG 06 1997

BUREAU OF
AIR REGULATION

Suite A · 730 North Waldo Road, Gainesville, Florida 32601 · Phone: 904/376-6533

July 29, 1997

RECEIVED

AUG 06 1997

BUREAU OF
AIR REGULATION

Mr. Willard M. Hanks
Division of Air Resources Management
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: Anderson Columbia, Inc.
Portable Crusher
D&A Project No.: 0410087801-0100

7775042-001-AC

Dear Mr. Hanks:

We are hereby submitting the application for a statewide permit for construction of a portable crusher. The crusher will initially be located in Lake City, Florida and will be moved to one of the counties identified on an as needed basis.

Please provide us guidance as to the publication of the required Public Notice.

Sincerely,

DARABI AND ASSOCIATES, INC.



Frank A. Darabi, P.E.
President

FAD/lef[ANDCOL.944]

xc: Ted McRae

INVOICE #	DATE	JOB ID	DESCRIPTION	CHECK #	052240
080597	8/05/97	001	PERMIT/CRUSHER	52240	1,000:00

CHECK NO. 52240 ANDERSON COLUMBIA CO., INC. 1,000.00



ANDERSON COLUMBIA CO., INC.
P.O. BOX 1829 • LAKE CITY, FL 32056
PH. (904) 752-7585



150 WEST MADISON ST.
LAKE CITY, FL 32055
63-62631

052240
CHECK NO.
52240

*****ONE THOUSAND DOLLARS AND NO CENTS*****

PAY TO THE ORDER OF

FLORIDA DEPARTMENT
OF ENVIRONMENTAL
PROTECTION

1

CHECK DATE
8/05/97

AMOUNT
*****1,000.00

ANDERSON COLUMBIA CO., INC.
NOT VALID AFTER 180 DAYS

⑈052240⑈ ⑆063100620⑆ 3110089617⑈