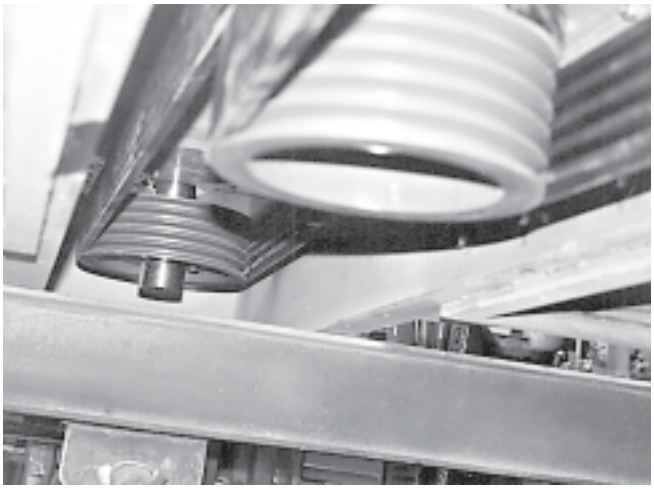
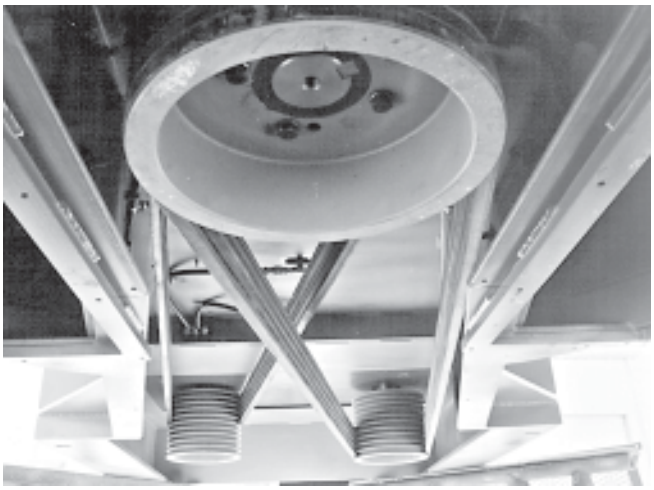
Belt Maintenance and Replacement

INTRODUCTION

CEMCO crushers transmit power to the pedestal through a V-belt drive. An opposing dual drive crusher has two sets of belts, one for each electric motor. A V-Twin arrangement has two sets of belts on the same side of the tub. A diesel drive crusher has a single set of belts from the gearbox. A properly maintained set of belts may last a year or more. Nevertheless, it is a good idea to have new drivebelts on hand. The belt quantity and belt size for your crusher are listed in the CRUSHER SPECIFICATIONS section. CEMCO uses 5V and 8V belt designations. Belts may be individual or "Powerband" style depending on required horsepower transmission. See your CRUSHER SPECIFICATIONS.



Dual drive belt arrangement



V-Twin belt arrangement

Worn belts are a safety hazard. Replace worn belts before they break. Always lock out power to the crusher before changing belts. Never operate the crusher without all the belt guards in place.

Never replace just one belt in a set. If you must replace one belt, replace all the belts.

It is acceptable to replace only one powerband.

All belts are required to transmit the design torque to the pedestal. Never operate a crusher that does not have all the belts installed.

Changing belts is also a good time to check the torque on the sheave mounting bolts. In some instances, the significant heat generated by the friction between the belts and the sheave may decrease the torque on the sheave mounting bolts.

REPLACING BELTS (ELECTRIC DRIVE)

1. Lockout power to the crusher.
2. Remove the belt guards beneath the crusher and set aside.

Loosening the motor mount bolts

3. Loosen the six motor mount bolts that hold the motor sled to the frame.
4. Use the provided wrench to loosen the belt tension adjustment screw. Turn the screw until the belts can be removed by hand. Remove the belts.

Loosening the belt tension adjustment screw

5. Install the replacement belts. It may be necessary to loosen the belt tension adjustment screw even more since new belts are not stretched out.
6. Tighten the tension adjustment screw until the belts reach the proper tension.
7. Tighten the six motor mount bolts.
8. Replace the belt guards.

Properly installed belt guard

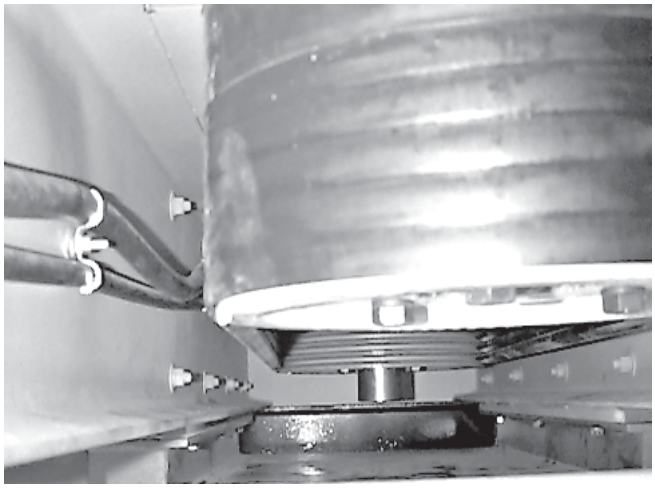
REPLACING BELTS (V-TWIN)

1. Lockout power to the crusher.
2. Remove the belt guards beneath the crusher and set aside.
3. Loosen the six motor mount bolts that hold the motor mount to the frame.

   3a. V-Twin crushers use a 2 stage pump with a "PUSH" and "PULL" capability.
4. Switch the lever on the hydraulic pump manifold to "PULL."
5. Pump the hydraulic hand pump to pull the motor sled towards the tub. Stop when the belts are loose enough to remove from the sheaves.
6. Install the replacement belts. It may be necessary to loosen the belt tension ram even more since new belts are not stretched out.
7. Switch the lever on the hydraulic pump manifold to "PUSH."
8. Pump the hydraulic hand pump until the belts reach the proper tension.
9. Tighten the six motor mount bolts.
10. Switch the lever on the hydraulic pump manifold to the neutral position.

REPLACING BELTS (DIESEL DRIVE)

Replacing the belts on a diesel drive crusher mounted on a trailer is similar but requires loosening six motor mount bolts and six gearbox mount bolts and sliding the entire engine and gearbox assembly on the trailer. Photos are shown below.



Powerbands under a diesel drive portable plant

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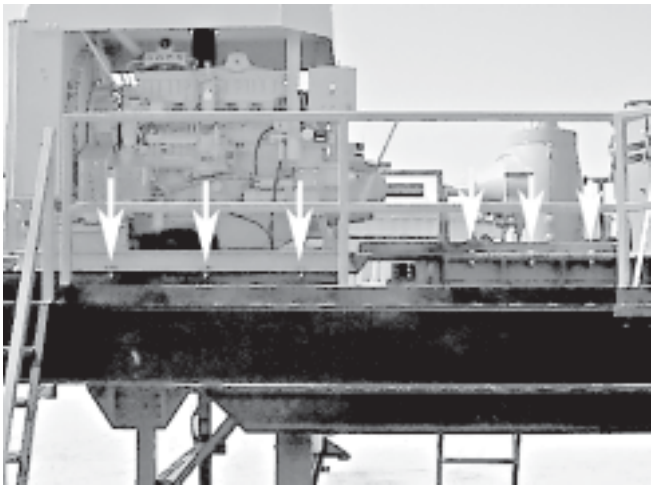
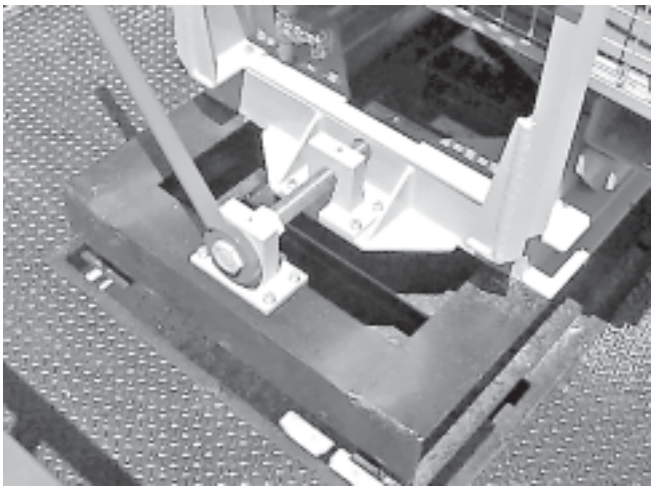


Engine and gearbox mounting bolts



Belt tension adjustment screw

[1]The Gates Rubber Company, *Heavy Duty V-Belt Drive Design Manual, Publication* No. 14995-A, 1/95.

How to Tension V-Belt Drives

General Method

Tension of the V-Belt is critical. A few simple rules about tensioning will satisfy most of you requirements.

1. The best tension for a V-belt drive is the lowest at which the belts will not slip under the higher load condition.
2. Check the tension on a new drive frequently during the first day of operation.
3. Check the drive tension periodically, thereafter.
4. Too much tension shortens belt and bearing life.
5. Keep belts and sheaves free from any foreign material which may cause slip.
6. If a V-belt slips, tighten it.

Numerical Method

While designing a drive, it is well to specify data for use in tensioning to drive. Many users of V-belt drives rely on their experience and the above general rules for tensioning drives, but it has become common practice to actually measure the tension in a drive. Numerical methods for measuring tension have several advantages. For example, they preventinexperienced personnel from drastically overtensioning or undertensioning a drive, thus preventing possible bearing or belt damage. Even with experienced personnel, it helps the individual get a feel for the tension needed in a particular drive. This is especially important with modern drives, where each V-belt is rated for higher horsepower than were previous belts. If a belt is to carry more horsepower, it must be installed proportionally tighter. Experience with older drives may lead to undertensioning of modern drives unless tension is measured at least once to help get the feel for correct tension.

The procedure in numerically tensioning a drive is:

1. Determine the correct tension for the stopped drive, called static tension, so that the tension will be correct when the drive is operating.
2. Measure the static tension so that it can be set at the correct value.

Tension Tester Method (Up to 30 lbs.)

1. Measure span length **(t)**.

2. Position the lower of the two O-Rings using either of these methods:

a. On the scale reading “Deflection Inches”, set O-Ring to show a deflection equal to 1/64" per inch of span length **(t)**.

b. On the scale reading “Inches of Span Length”, set O-Ring to show a deflection equal to the inches of measured span length **(t)**.

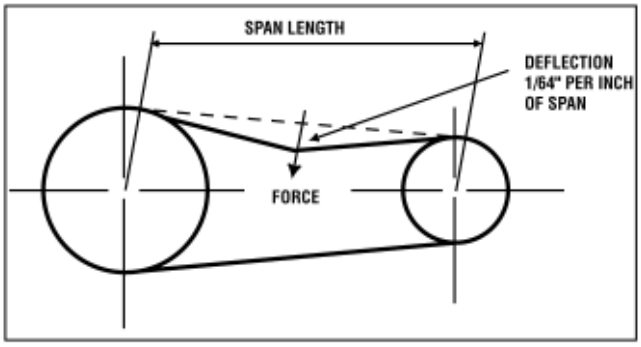
3. At the center of span **(t)**, apply force with Gates Tension Tester perpendicular to the span, large enough to deflect one belt of a multiple belt set on drive until the bottom edge of the lower O-Ring is even with tops of remaining belts. For drives with only one belt, a straightedge across pulleys will assure accuracy of positioning.

4. Find the amount of deflection force on upper scale of Tension Tester. The Sliding Rubber O-Ring slides up the scale as tool compresses and stays up for accurate reading of pounds force. Read at the bottom edge of ring (slide ring down before reusing).

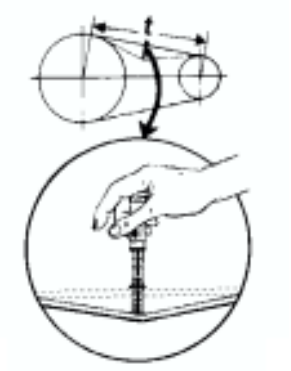
5. Compare deflection force with range of forces recommended.

If less than minimum recommended deflection force, belts should be tightened. If more than maximum recommended deflection force, drive is tighter than necessary.

NOTE: There normally will be a rapid drop in tension during the “run-in period” for V-belt drives. Check tension frequently during the first day of operation.



Recommended Deflection Force Per Belt For Super HC® V-Belts, Super HC PowerBand® Belts, Super HC Molded Notch V-Belts or Super HC Molded Notch PowerBand Belts					
V-Belt Cross Section	Small Sheave Diameter Range (Inches)	Small Sheave RPM Range	Speed Ratio Range	Recommended Deflection Force (lbs)	
				Minimum	Maximum
3V	2.65 – 2.80 3.00 – 3.15 3.35 – 3.65 4.12 – 5.00 5.30 – 6.90	1200 - 3600 1200 - 3600 1200 - 3600 900 - 3600 900 - 3600	2.00 to 4.00	3.0 3.3 3.7 4.4 4.8	4.3 4.8 5.4 6.4 7.1
3VX	2.20 2.35 - 2.50 2.65 - 2.80 3.00 - 3.15 3.35 - 3.65 4.12 - 5.00 5.30 - 6.90	1200 - 3600 1200 - 3600 1200 - 3600 1200 - 3600 1200 - 3600 900 - 3600 900 - 3600	2.00 to 4.00	2.8 3.2 3.5 3.8 4.1 4.8 5.8	4.1 4.7 5.1 5.5 6.0 7.1 8.6
5VX	4.40 - 4.65 4.90 - 5.50 5.90 - 6.70 7.10 - 8.00 8.50 - 10.90 11.80 - 16.00	1200 - 3600 1200 - 3600 1200 - 3600 600 - 1800 600 - 1800 400 - 1200	2.00 to 4.00	9.0 10 11 13 14 15	13 15 17 19 20 23
5V	7.10 - 8.00 8.50 - 10.90 11.80 - 16.00	600 - 1800 600 - 1800 400 - 1200	2.00 to 4.00	11 13 14	16 18 21
8V	12.50 - 17.00 18.00 - 24.00	600 - 1200 400 - 900	2.00 to 4.00	28 32	41 48



Read the scales at the bottom edge of the O-Ring. Leave the upper O-Ring in maximum "down" position.