Removal and Installation Guidelines

For:

Drive Unit Removal and Re-installation

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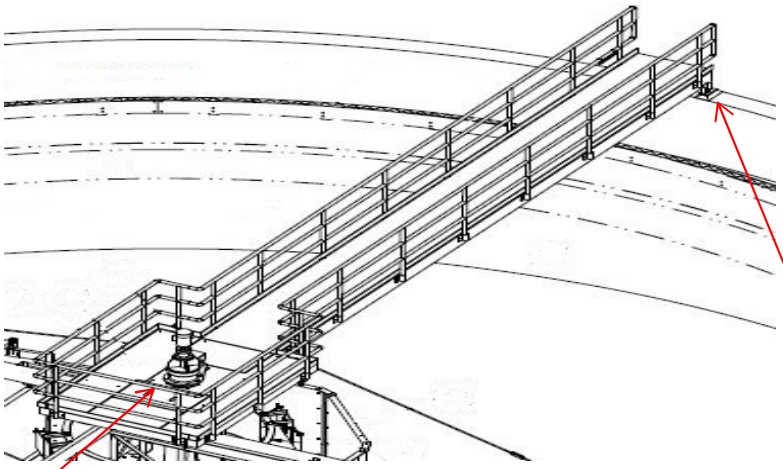
WESTECH

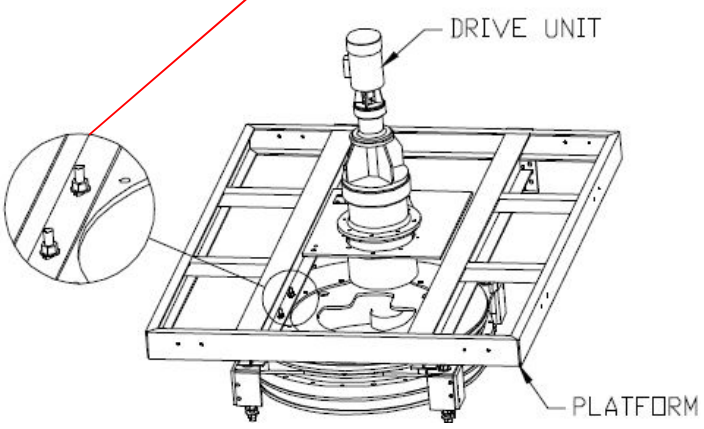
Walkway Removal

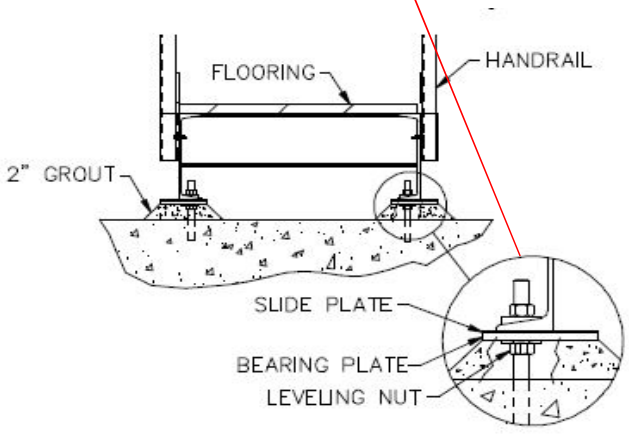
All sketches are for illustration only. Refer to the general arrangement and general erection drawings for specific information concerning your exact equipment details.

1. Remove the flooring on the walkway and center drive platform.
2. Remove the four (4) bolts (two (2) on each side of the drive unit) attaching the walkway to the drive unit. Remove the two (2) hex nuts and washers at the end of the walkway near the tank wall.

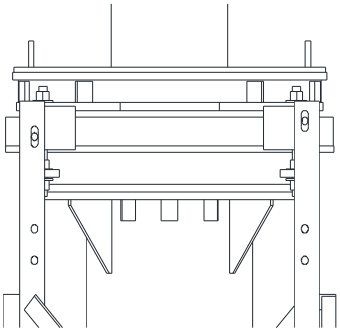
Note: Additional care must be taken when lifting the walkway to prevent twisting or bending of members.



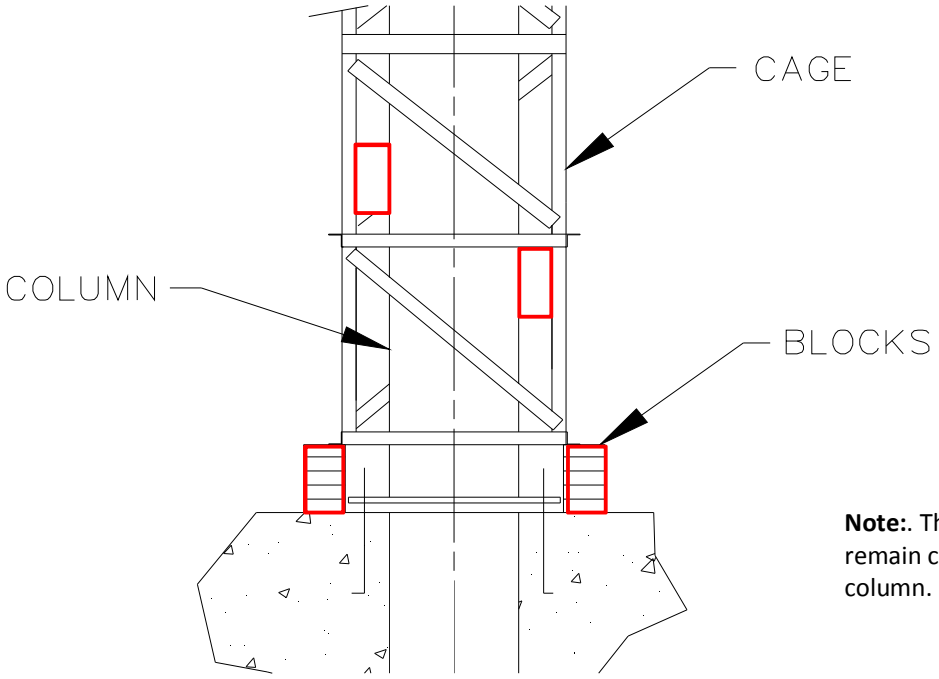




Center Cage Blocking (Drive Removal)



1. Place blocking or jacks on the bottom of the tank to support the cage and rake arms during drive removal. The blocking needs to hold the mechanism in place when disconnecting it from the drive unit. **Blocking must be placed directly under a vertical corner or structural member.**
2. Place blocking or build framing between the center column and the cage, to ensure the cage stays concentric with the column once the drive is removed.



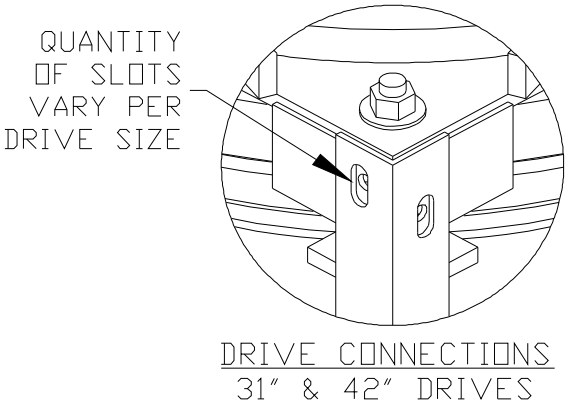
Note:. The center cage must remain concentric with the column.

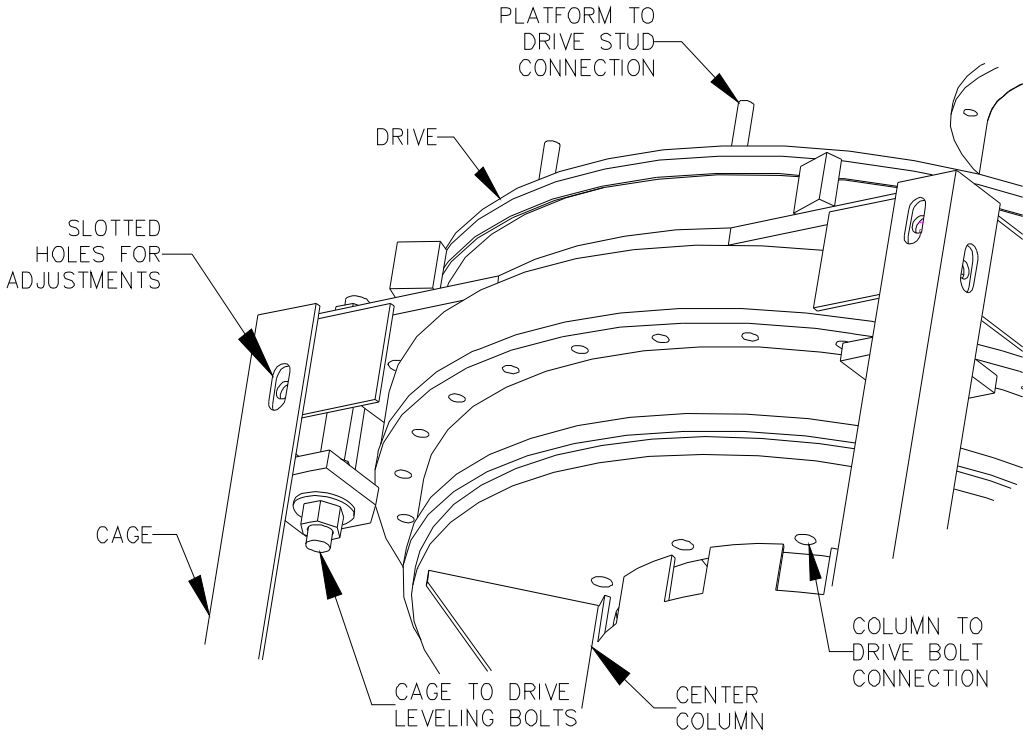
Removal and Installation of the Drive Unit

Once blocking is in place and the weight of the mechanism is removed from the connection points, loosen the drive to cage connection bolts.

Note: When removing cage leveling bolts only remove the top nut and leave the lock nut and bottom nuts where they are so that when replacing the drive unit, it will be close to where it was before removal and will require very little adjustment to level the drive unit.

Be sure that the drive is lifted using the lifting lugs provided in the drive base (see Lifting the Drive Unit section below).



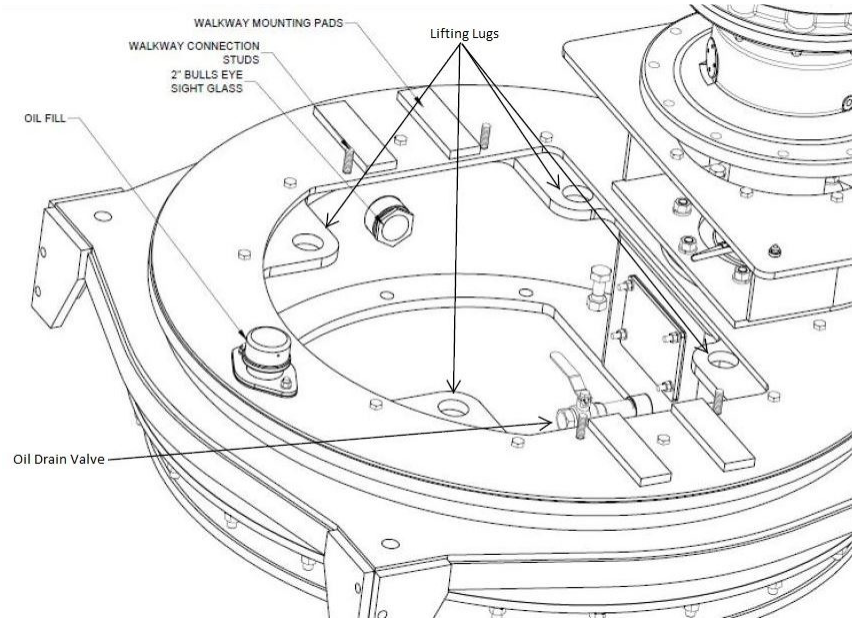


Lifting the Drive Unit

Before lifting the drive unit, make sure that all lubricants and liquids have been drained from the drive unit. In order to drain the liquids place a 5 gallon bucket below the oil drain valve, then open the valve. Make sure the oil drain valve is closed before moving the drive unit.

Note: It may take a couple of buckets to completely drain the drive unit of all liquids.

Lift the drive unit using the lifting lugs provided in the drive base. Keep the drive unit as level as possible during lifting. Spreader bars may be necessary to keep the lifting cables from touching other parts of the unit as this may cause damage. **Any lifting lugs on individual components (motor, reducer, etc.) are for lifting those components only during assembly or disassembly and are not for lifting the entire drive.**



Drive Unit Installation

Make sure both mounting surfaces are clean and free from foreign debris. Place the drive unit on the walkway frame (shaft drive) or the center column (cage drive). The drive should be loosely fastened to the walkway or center column.

The final check for level will be completed after all the items designed to hang from the drive are attached.

Final Check for Level

The objective in the final check for level is to verify that the drive unit is level. This will ensure proper operation and will extend drive-bearing life. This will be done by checking the level at the end of one arm, at various points around the tank. The entire mechanism should be assembled at this point, especially parts that attach to the cage or the arms.

Benchmarks

All sketches are for illustration only.

1. Using a surveyor's level, benchmark the tank wall at four equally spaced locations (90 degrees apart) and approximately 2 feet above tank bottom. **These reference marks will be used later to check final level of the drive.** They should be oriented 45 degrees from walkway centerline (See Figure 1).

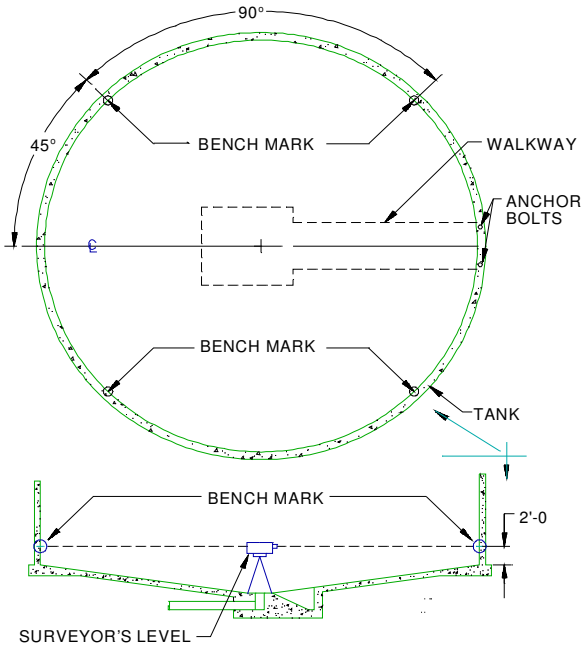


Figure 1 Bench Mark Drawing.

1. Only one arm is used to check if drive is level. Rotate the drive and stop the arm at one of the level points marked around the tank. Using a carpenter's level as an extension from that arm to the tank wall, make a second mark on the wall. Repeat procedure rotating **the same arm** to each of the four marks on the tank.

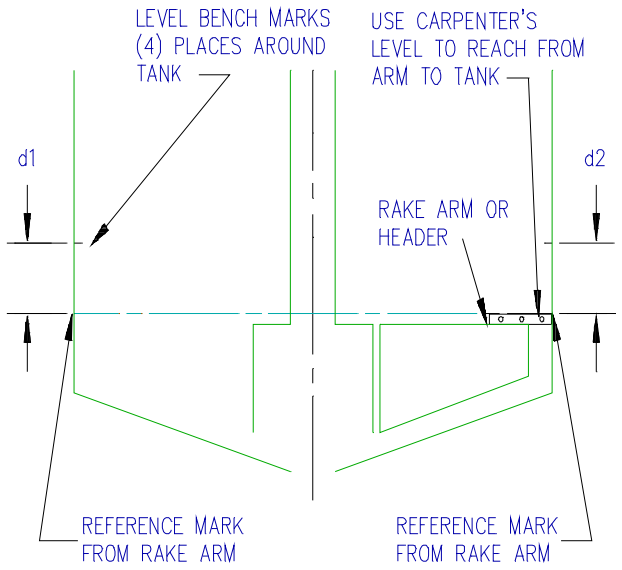


Figure 2 Benchmark Drawing

2. If power is not available, remove the fan cover and rotate the drive by turning the fan. Do not push rake arms or otherwise move arms during the leveling.
3. Referring to the illustration, compare the difference in dimensions between the level marks and the rake arm reference marks at diametrically opposite sides of the tank.
4. The difference between the two observed dimensions (d1 minus d2) must not exceed the tolerance shown on the following chart. If the given tolerance is exceeded, adjustment to the drive level should be made.

Tank Diameter	Tolerance (d1 minus d2)
> 0 foot & ≤ 50 foot Diameter	1/4 inch
> 50 foot & ≤ 75 foot Diameter	3/8 inch
> 75 foot & ≤ 100 foot Diameter	1/2 inch
> 100 foot & ≤ 125 foot Diameter	5/8 inch
> 125 foot & ≤ 150 foot Diameter	3/4 inch
> 150 foot & ≤ 175 foot Diameter	7/8 inch
> 175 foot & ≤ 200 foot Diameter	1 inch
> 200 foot & ≤ 225 foot Diameter	1 1/8 inches
> 225 foot & ≤ 250 foot Diameter	1 1/4 inches
> 250 foot & ≤ 275 foot Diameter	1 3/8 inches
> 275 foot & ≤ 300 foot Diameter	1 1/2 inches
> 300 foot & ≤ 350 foot Diameter	1 5/8 inches
> 350 foot & ≤ 400 foot Diameter	1 3/4 inches

Drive Leveling Tolerances

5. If shimming is necessary, use leveling bolts on drive unit. This procedure checks and adjusts **internal** drive bearing level, which is not possible until this stage of assembly work. Shim until level tolerances are achieved.
6. In making a final adjustment, care should be taken to tighten the drive mounting bolts equally. Uneven tightening may cause deformation of the bearing races, causing shortened bearing life.
7. Recheck for level after the drive unit has been shimmed, leveling bolts loosened, and drive mounting bolts tightened.
8. Maximum bearing life of the drive unit main bearing is dependent on proper leveling. Perfect final leveling is not practical; however, it should be as accurate as possible. As the diameter of the mechanism increases, it becomes increasingly difficult to obtain an accurate adjustment.

9. Once leveling and grouting has been completed remove the sand bags and block arms up if necessary.

Final Arm Adjustment

Now that the drive is level to the desired tolerance, re-adjust both arms to sweep the tank identically.

Adjust one arm to sweep so that the center of the blades clear the rough concrete tank bottom by 3-1/2 inches or the finished floor by 1-1/2 inches if no grout will be used. Make this adjustment by jacking the arm and tightening (or loosening) the adjustment studs at the cage. Rotate the opposite arm to the **same** location where the first arm was adjusted. Adjust the second arm to be the same distance from the tank bottom as the first.

A good way to do this is to place a pile of sand in front of one arm and rake it level with the mechanism. Then, rotate the opposite arm to this same position and adjust it to the raked sand pile.

If the cage and rake arms are galvanized, permanently secure the arms by properly shimming and tightening the rake arm to cage connections.

Lubricate the drive unit according to the instructions. Refer to Drive; Maintenance; Drive Lubrication. The accessory equipment (motor, reducer, etc.) should be lubricated according to the respective manufacturer's instructions. Refer to Drive; Accessory Equipment; the respective manufacturer's instructions.

Connect the drive motor for proper direction of rotation as shown on the general arrangement / drive assembly drawings. Refer to drive rotation direction arrow sticker placed on the drive. WesTech will not accept responsibility for any damage caused by the drive rotating in the wrong direction. On multi-pinion drives, be sure all motors are connected to rotate in the same direction. This is done by removing all motors and confirming they all rotate in the same direction. Severe damage to the drive will result if all motors do not run in the same direction.

Connect the motor alarm and cutout limit switches in the torque control device. Manually check to make sure that the alarm and motor cut out switches function properly at the torque values specified on the general arrangement drawings. This is done by pressing the rod that is covered by a red rubber cap on the outside of the torque box.

Welding Warning

If field welding is required after the drive is installed, **do not** allow current to pass through the precision bearing balls. This will result in sparking between bearing balls and bearing races and will destroy the precision bearing assembly. **Do not weld on the drive unit itself.** Attach the welding ground directly to the part to be welded. **Failure to observe this warning will void the drive warranty.**

Shimming the Drive

In order to achieve maximum drive bearing life, the drive base must be properly shimmed. After the drive is leveled, shims should be placed in any gap exceeding 0.005" between the mounting surface and the drive base. Refer to drawing 900-611D Drive Shimming Procedure. This may require placing shims on both the inside and the outside of the drive base. **Shims are not provided by WesTech and should be supplied by others.**

After the drive is leveled and fully shimmed, loosen jack screws (or external hydraulic jacks) and evenly tighten drive mounting bolts. After the bolts are tightened, the final level must be verified.

Start-up

Before starting the drive, make sure the tank and mechanism path are free from any debris and obstructions. Check drive and accessory equipment for proper lubrication. Perform a test on the motor windings to make sure there is no electrical current leakage between the windings. Disconnect any sensitive electronic equipment before performing megger test. Watch for correct rotation of the mechanism and any interference.

For drives with a lift, the lifting mechanism should raise the rake arms at the preset torque. When the lifting device is used, check clearances in the up and down positions of the rake arms.

Observe the drive and other mechanisms for proper and unobstructed operation. The tank is now ready for the influent. A gradual increase in the indicated torque is normal as influent is being introduced. Any irregular or jerking motion in the operation of the rake arms must be immediately investigated and remedied. A minor amount of 'swing' is normal for operation in an empty tank.

Check the alarm switch and motor cutout switch wiring by pressing the rod that is covered by a red rubber cap on the outside of the torque box. An alarm should sound and the motor should shut off when these switches are activated. A latching relay that is manually reset must be used in the control wiring to prevent the mechanism (clarifier, thickener, etc.) from relaxing and overloading itself several times without resolving the cause for overload.