



Conveyor and Pre-wash Equipment Overview

Objectives

To review the conveyor-related equipment and pre-wash equipment that is used at a typical tunnel car wash.

Content

1. Conveyors

a. Correlators

- 1) Description
 - a) Used to align the vehicle with the entrance of the Conveyor.
The Correlator is a series of stainless-steel tubes mounted in a frame and recessed into the floor at the entrance end of the conveyor.
 - b) The tubes are free to spin on UHMW Bushings.
 - c) Available sizes are 8' or 12' wide and 27" to 36" across.
 - d) Utilizes guide rails to push vehicle to the side for proper alignment. These are welded into place at installation.
 - e) The simple design of the Correlator eliminates the need for springs and wheels, which require greasing.
 - f) Because of the plastic bushings the only preventive maintenance is cleaning.
- 2) Preventive Maintenance Requirements
 - a) **DAILY**
 - (1) During Operational Checks observe general examination of operation, listening for any unusual noises. Observe the operation of roller tubes.
 - (2) During Closing Checks wash down Correlator with prep gun.
 - b) **MONTHLY**
 - (1) Inspect all hardware and fittings for tightness and clean the entire assembly thoroughly.
 - c) **ANNUALLY**
 - (1) Carefully inspect roller tube bushings. If worn excessively replace. Also replace any bent roller tubes.

b. Over-Under Conveyor

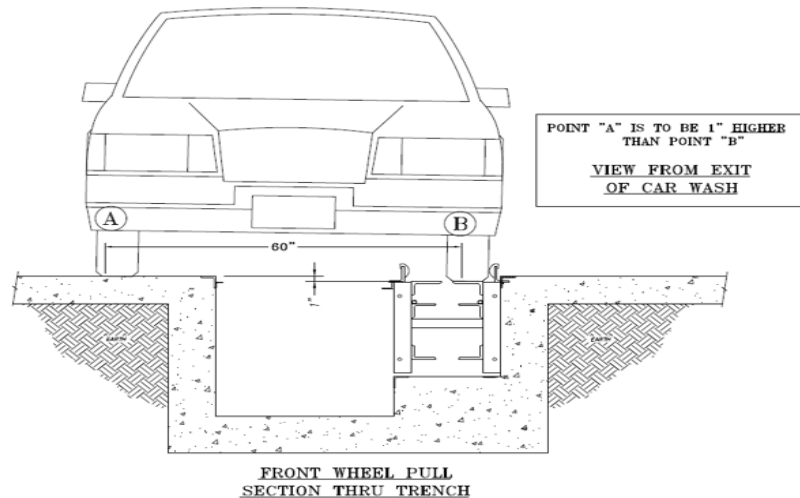
- 1) Description



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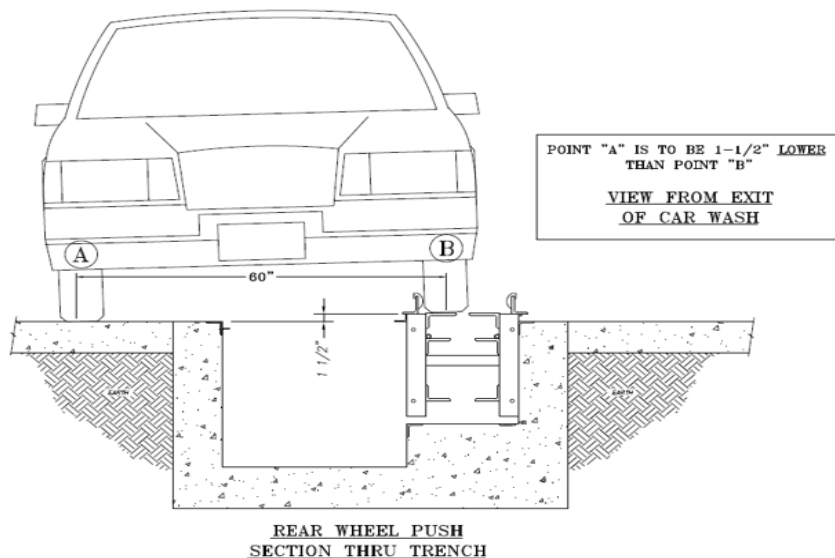
- a) Used to move the vehicle through the tunnel by bringing up a roller, which is attached to a long length of chain beneath the driver side tire. Front Wheel Pull (FWP)—the roller comes up behind the front wheel and pulls the car through the tunnel.

Front Wheel Pull



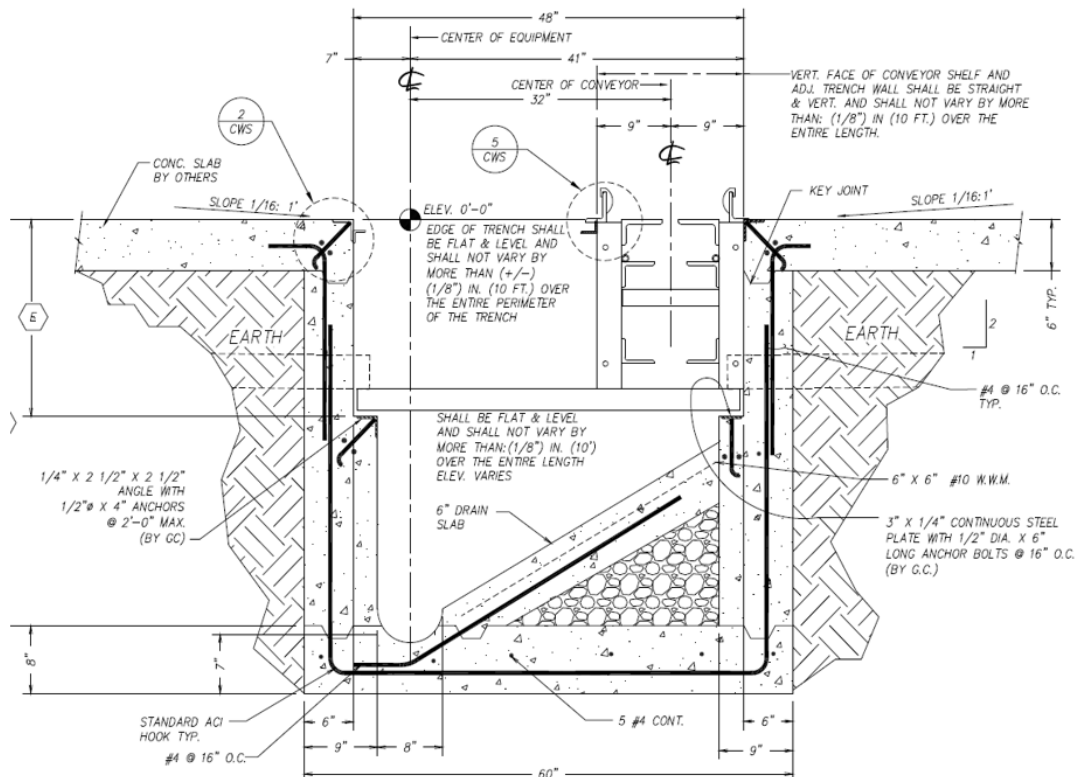
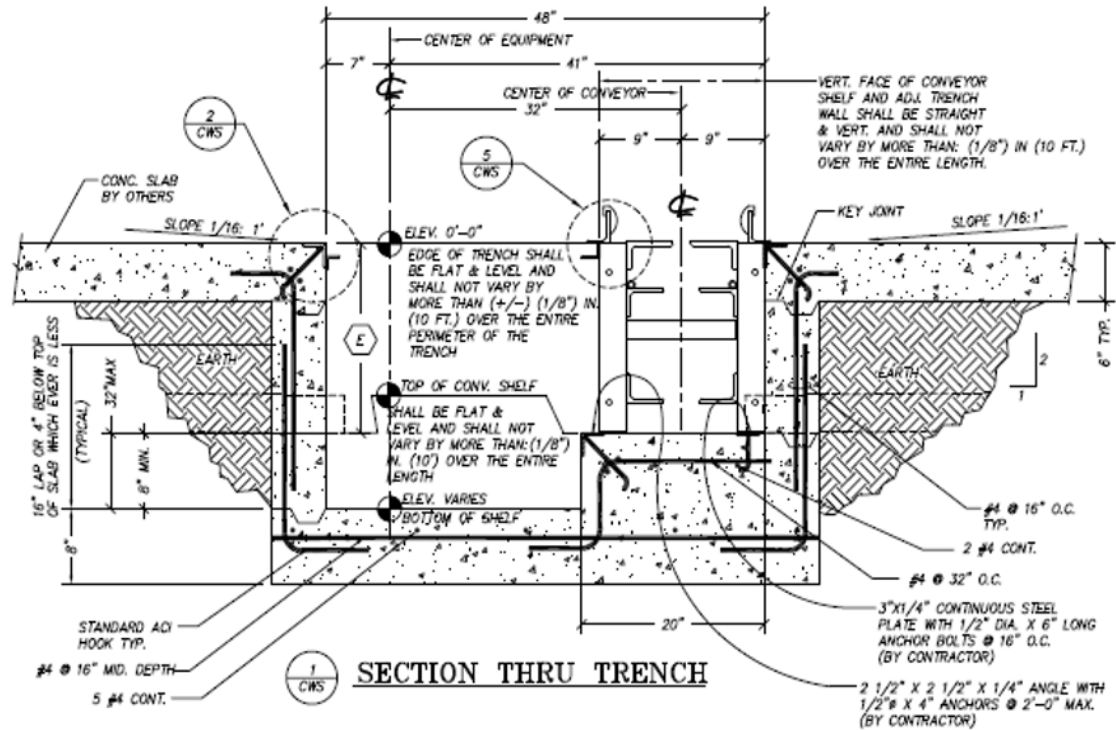
- b) Rear Wheel Push (RWP)—the roller comes up behind the rear wheel and the car is pushed through the tunnel.
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Rear Wheel Push





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2) Sections

- a) The **Take up section** is located at the entrance end of the tunnel and has a free-wheeling sprocket or drum mounted in the take-up slide. There are spring or air shocks, which keeps the chain at the proper tension and protects it from sudden stops.



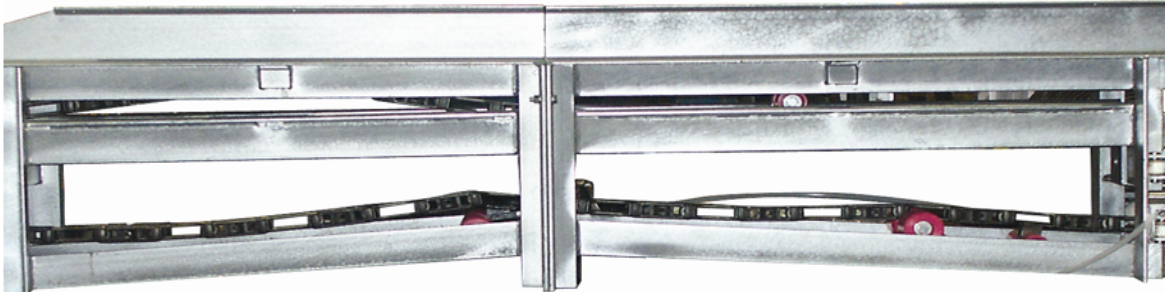
- b) The **Drive section** is at the exit end of the tunnel and has a trap door, which opens to allow the roller to return to the lower level to transit to the entrance end of the tunnel. The hydraulic motor and Heco gear box in this section is used to pull the chain through the conveyor. The drive section may contain a pulse switch to send a signal to the tunnel controller and is used to measure the movement of the vehicle through the tunnel or the pulse switch may be located remotely in the equipment room.



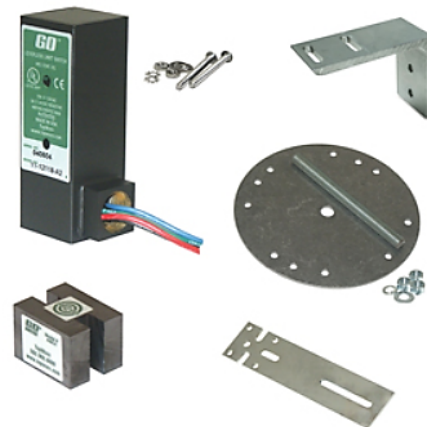


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- c) Multiple center sections make up the distance from the Take-Up section to the Drive Section



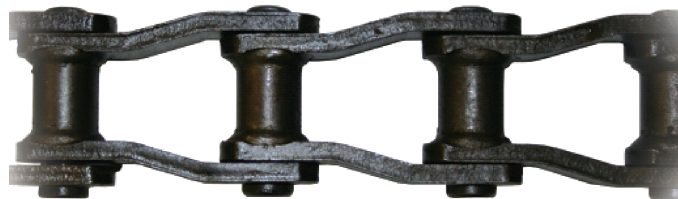
- (1) The chain and rollers travel to the entrance end of the tunnel through the bottom level of these sections.
- (2) The chain and rollers travel to the exit end of the tunnel through the middle level of these sections.
- (3) The roller only is brought up to the top level of the center sections when required to pull or push a vehicle through the tunnel.



3) Chains and Rollers

- a) There are several chain and roller designs used in conveyors.

(1) Chains



(2)

- (a) SC78 Welded Steel has been used for decades, is heavy duty and reliable.





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- (b) D88K Steel Pintle Chain is less expensive because there is no welding in the manufacturing process.



- (c) Log Chain eliminates pin and cotter links allowing for a quick re-tensioning of the chain. Heavier duty than pin and cotter chain.



- (d) X458 Chain (aka dogbone) is an older design that recently returned to the market, is fairly easy to work on, and does not utilize cotters.



- (e) Low-Profile Roller - The low profile roller was the standard for the industry from the 80-90's. As vehicles got bigger and heavier, these rollers would slide under tires.



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- (f) Mid-Profile (standard) Replacement for the low profile. Stands taller to move heavier vehicles without sliding under the tire.



- (g) Tall-Profile

Use to push larger vehicles with larger diameter tires.

This is actually a low profile roller flipped upside down.

All six wheel rollers were attached to chain by either carrier links or triangle plates.





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(h) Mid-Profile / Four Wheel

Provides a tall enough profile to push most vehicles and provide sufficient clearance. Direct connect link now welded to roller eliminating wear point of triangle plates or carrier links.



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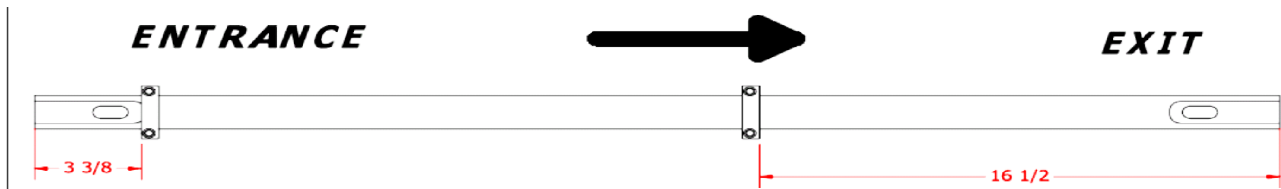
2) Adjustments

a) Roller-Up Air Pressure – Air

- (1) Adjustment is made at air regulator on the Control Panel.
- (2) Should be set to 40-50PSI at the switch.
- (3) Observe movement of Roller-Up forks. They should move smoothly up and down.

b) Chain Length – Air

- (1) Run conveyor to position chain so removable links are easy to work on and stop it there.
- (2) Check the position of the carriage on the slide tube, if there is less than $\frac{1}{2}$ " between the carriage and split collar links should be removed. (See figure #1 for collar placement.)



- (3) Run the Conveyor until you see the master link section approaching the Take-Up section and stop the Conveyor just before that section reaches the Take-Up Sprocket.

Caution: You must shut off all power to the conveyor and lock out the Motor Control Center before getting in conveyor pit and starting this repair.

- (4) Shut off all power to the conveyor and lock out the Motor Control Center.
- (5) Release the air pressure to the shocks using the tension valve on the control panel.

Note: It may be necessary to use a pry bar to move the carriage all the way forward.

- (6) Remove pin and cotter from a chain link.
- (7) Remove pin and cotter from other end of the same chain link and remove the link.
- (8) Reconnect the ends of the chain using pin and cotter, replace cotter if damaged.



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- (9) Flip the tension valve back to the on position to allow chain to be tensioned.

Note: Chain tension should be set to 40-70PSI depending on style of chain. If chain tension appears not to be working properly, check the air shocks for water. If water is encountered, shocks will need to be replaced and an air dryer added to the air compressor.

Caution: Before returning power to the conveyor and removing lock out from the Motor Control Center make sure all personnel are clear of the operational area.

- (10) Remove lock-out and run conveyor, make sure the carriage sits between the two collars. If not repeat Steps 1 – 9.

c) Conveyor Speed

- (1) Conveyor speed can be adjusted at the flow-control valve on the Hydraulic Power Pack that supplies fluid for the Conveyor or by adjusting the Hertz on the VFD if electric.
- (2) Conveyor speed may be set from 50 to 200 CPH (cars per hour) depending on the equipment in the tunnel and the quality of wash desired.
- (3) To determine the speed of the chain measure the length in inches a roller travels in 15 seconds. That number will be the same as the number of cars per hour the conveyor is set to.

3) Preventive Maintenance Requirements

a) DAILY

(1) Opening Checks

- (a) Check for leaks around hoses and fittings, repair any hydraulic leaks immediately.
- (b) At Drive Section, check for hydraulic leaks around the Drive Motor and connectors.
- (c) At Take-Up Section, check for air leaks around Roller-Up cylinder and shocks.

(2) Operational Checks

- (a) Check the position of the carriage on the slide tube, if there is less than ½" between the carriage and split collar a links should be removed. To ensure the chain does not become slack and cause jams (See figure #1 for collar placement).
- (b) General examination of general operation, listening for any unusual noises. Observe the operation of the conveyor, the roller-up function, and power pack,



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watch for anything out of place and listen for any unusual noises.

(c) Check the water level in the pit.



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(3) Closing Checks

- (a) Remove pit grading from the Take-Up and Drive sections of the conveyor and wash down the conveyor using prep gun. **This should be done at the end of each day to prevent buildup which could cause chain jams and premature wear.**
- (b) Check for debris wrapped around the drive or take-up sprockets/drum and remove.

b) WEEKLY

- (1) Perform a close inspection of operation.
 - (a) Check Roller-Up operation, fork alignment and freedom of travel at the Take-Up section.
 - (b) Check for oil leaks around drive motor and speed reducer at the Drive section.
 - (c) Check for sprocket alignment and sprocket wear at both Take-Up and Drive sections.
- (2) Wipe excess dirt and grime off the Take-Up slides with a clean rag.
- (3) Grease Take-Up shaft bearings with 1-2 pumps per bearing.
- (4) Spray lubricant on the air cylinder rod end and clevis.

c) MONTHLY

- (1) Closely inspect each roller, chain link and cotter pin closely for wear and damage, replace as necessary.
- (2) Inspecting all hardware and fittings for tightness.
- (3) Grease the 2 slide tubes, until grease comes out the weep hole.
- (4) Clean the entire assembly thoroughly.

d) ANNUALLY

- (1) Have a licensed electrician measure and record, full load current readings from each of the three legs of each of the three phase electric motors. (Power pack or electric drive motor)
 - (a) If the differential of current load exceeds 10% between the legs, or the balanced load current of all three legs has increased over 10% since the most recent measurements, order a replacement motor.
 - (b) Record readings in the annual log.