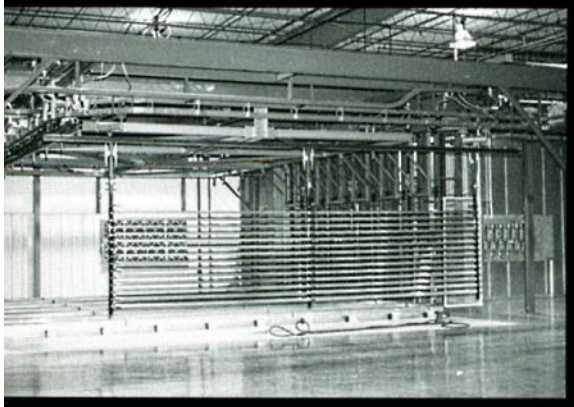
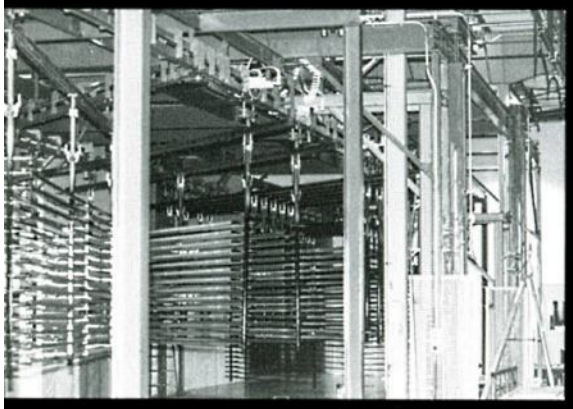
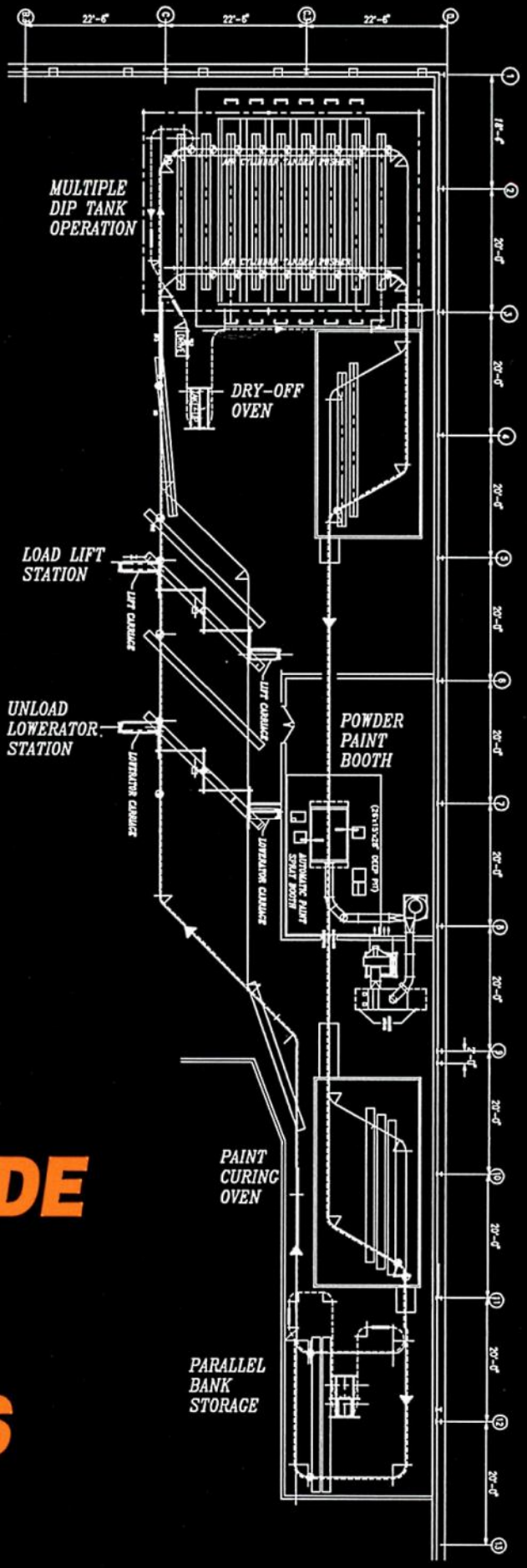


MULTIPLE DIP TANK

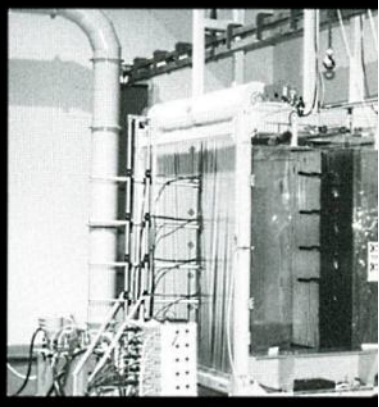


UNLOAD LOWERATOR STATION

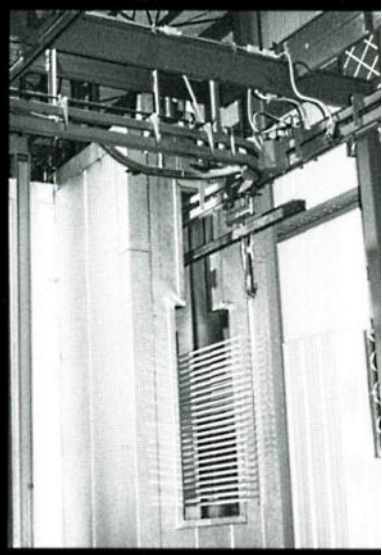



# RAPID DESIGN GUIDE FOR OVERHEAD CONVEYORS

DRY-OFF OVEN



POWDER PAINT BOOTH



PAINT CURING OVEN

**Rapid Industries, Inc.**
4003 Oaklawn Dr. • P.O. Box 19259 • Louisville, KY 40259-0259
(502) 968-3645 • Fax: (502) 968-6331
1-800-RAPID81 • Fax 1-888-225-3564

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# 12 BENEFITS OF RAPID OVERHEAD CONVEYORS AND HOW THEY WILL HELP YOUR PRODUCTION AND REDUCE COSTS!

### 1. HAS ACCESS TO AREAS YOUR EMPLOYEES ARE NOT TO ENTER
Rapid Conveyors transport your product through process areas such as washing and painting booths, furnaces and ovens, freeze rooms or booths where extreme hot/cold temperatures prevent personnel from entering.

### 2. ACCOMPLISHES WHAT YOUR EMPLOYEES CANNOT
Where solvents, acids, or dust prevent the presence of your employees, your parts can be degreased, dipped, plated, coated or painted, all automatically.

### 3. ASSITS YOUR EMPLOYEES IN PRODUCTION OPERATIONS
Rapid Overhead Conveyors carry your parts or assemblies to your employees where they can efficiently perform their task and then to the succeeding stages in the manufacturing process, all automatically and at a rate that YOU determine.

### 4. GREATER WEIGHT CARRYING CAPABILITIES THAN AN EMPLOYEE
A Rapid Overhead Conveyor will carry continuously its maximum load suspended from each trolley over the entire route of the conveyor system. Each trolley may carry either single or multiple items depending on its shape and weight.

### 5. NEVER TIRES OR NEEDS BREAKS
A Rapid Conveyor works 24 hours a day for weeks on end and automatic lubrication and minimal maintenance result in the enviable record.

### 6. SETS RATE OF PRODUCTION
With variable speed drive, the system will permit you to control rate of travel of your parts or materials to maximize efficiency and production capabilities.

### 7. EFFICIENT USE OF SPACE
Our system uses little or no floor space which is an important element in today's competitive market. Often, a Rapid System can be installed where a floor conveyor would be precluded due to space limitations.

### 8. CONTROLLS QUALITY OF PRODUCTION
A Rapid System eliminates most manual handling, loading/unloading and transporting of your product by your employees. With a reduction in the contacts of your product with personnel, quality is noticeably improved.

### 9. PRODUCTIVITY IS IMPROVED
A system also delivers a continuous flow of material or parts to and from each production area. Your personnel become more efficient and productive because the parts or materials they need are there on schedule and easily accessible.

### 10. REDUCES PER UNIT COSTS
A system eliminates most of the manual handling of parts or materials. By doing so, considerable lost motion is also eliminated resulting in a reduction of per unit costs.

### 11. EXPEDITES INSPECTION
A Rapid System permits a continuous inspection process instead of a batch method where delays are inherent in the handling of item to be inspected.

### 12. MORE EFFICIENT PACKAGING AND SHIPPING
Finally, a Rapid system will deliver to packaging equipment a steady flow of product or material at a predetermined rate compatible with capacity. Shipping will then receive a steady output of product that can be more readily accommodated.

# GLOSSARY OF CONVEYOR TERMS ACCUMULATING

**AIR-OPERATED TAKEUP**
An assembly of the structural and mechanical parts which provides the means to adjust the length of the power chain by the use of an air cylinder to compensate for chain stretch, shrink, or wear and to maintain proper tension.

**ANTIBACKUP**
A mechanical safety device to prevent reversal of a loaded conveyor under action of gravity when forward travel is interrupted.

**ANTIRUNAWAY**
A safety device to stop a declining conveyor and thus prevent running away in event of an electrical or mechanical failure.

**AUTOMATIC LUBRICATOR**
Automatically lubricates chain, trolley wheels or other components as they pass.

**BACKSTOP**
Mechanical device used to prevent reversal of a loaded conveyor under action of gravity when forward travel is interrupted. An antibackup.

**BACKUP BAR**
Heat treated bar drive component used to back up the caterpillar chain dogs.

**BACKUP ROLLERS**
Series of rollers mounted in the drive to retain the conveyor chain in proper relation to the caterpillar chain dogs.

**BALANCED DRIVED**
Two or more drives on one conveyor chain each driving the conveyor with a predetermined share of the load with synchronized speed.

**BEAM CLAMP**
Device for gripping the flange of supporting beams or trusses for the purpose of suspending a conveyor frame or track.

**BEAVER TAIL**
Tail plate or after configuration of a free trolley that, when engaged with the duck bill or lever arm and bumper on successive trolleys, permits accumulation of the free trolleys.

**“B” / BOLT ATTACHMENT**
Trolley attachment with threaded rod projection for attaching load bar or various objects.

**“C” / PENDANT ATTACHMENT**
Trolley attachment projecting through chain having a single hole for supporting loads.

**CATERPILLAR CHAIN**
Short endless chain on which dogs or teeth are spaced to move a conveyor power chain.

**CATERPILLAR CHAIN DOG**
Dog or tooth attached to a caterpillar drive chain to provide the driving contact with the conveyor power chain.

**CATERPILLAR DRIVE**
Drive equipped with a caterpillar chain to propelling the conveyor power chain.

**CATERPILLAR TAKEUP SPROCKET**
Non-driving sprocket of a caterpillar drive which is adjustable to tension the chain.

**CENTER LINK**
Loop-shaped link of rivet less chain which provides the bearing surfaces for the pins and permits passage of the trolley load support members through the chain.

**CHAIN PIN**
Pin used to connect succeeding links of a chain about which the link pivots.

**CHANGE OF ELEVATION**
Vertical distance between the upper horizontal tracks of a vertical curve to the corresponding point on the lower horizontal track.

**CLEVIS PIN ATTACHMENT**
Forged chain pin with a clevis on one end used for supporting light loads from a trolley conveyor chain between trolleys.

**COMPOUND VERTICAL CURVE**
Assembly of two single vertical curves with connecting tracks that change the elevation.

**CONVEYOR GUARD**
Structure mounted below the conveyor path to protect personnel and equipment below.

**COUNTERWEIGHTED TAKEUP**
An assembly of the necessary structural and mechanical parts which provides the means to adjust the length of the power chain by the use of counter-weights to compensate for chain stretch, shrink, or wear and to maintain proper tension.

**DRIVE FRAME**
Structure which supports the drive shaft assembly and machine parts which contains the motive power or supports the assembly to which the motive power is connected.

**DRIVE SHAFT**
Main driving shaft on which the conveyor sprocket is mounted.

**DRIVE SPROCKET**
Driving sprocket of a caterpillar drive or of a sprocket drive.

**DROP**
Vertical distance from the top of the I-Beam track to the centerline of the power chain.

**DROP SECTION**
A section of free track that can be lowered hydraulically, pneumatically or by electrical means, to pick up a load and return to the original elevation of the adjacent power and free track to permit the trolleys on the drop section to enter the rest of the overhead conveyor system.

**DUCK BILL**
Actuating lever on the forward end of a free trolley, that, when engaged with the beaver tail or after plate configuration of preceding trolleys, will retract the power dog on the free trolley, disengaging it from the power chain and permitting accumulation of the free trolleys.

**FROG**
The diversion mechanism in a switch that may be manually operated or powered.

**"H" / CLEVIS ATTACHMENTS**
A forked or clevis type trolley attachment to suspend a load.

**HANGER STEEL**
Structural members by which a conveyor is hung from supports.

**HEADER STEEL**
Steel framing supporting the overhead conveyor track with all trolleys, chain and the total load including product and hangers.

**"I" / IDLER ATTACHMENT**
An attachment used to complete the assembly of a no-load carrying trolley.

**KICKER**
A roller bank turn or traction wheel used to align the power chain to the centerline of the track in horizontal deviations of 45° or less.

**LINK**
A chain unit of one pitch length.

**LOAD BAR**
A device used to distribute a load over pairs of trolleys.

**MULTIPLE DRIVES**
Two or more motorized drives applied to a single conveyor for the purpose of reducing the chain tension in any given section.

**"C" / PENDANT ATTACHMENT**
Single bar trolley attachment projecting through the chain having a single hole for supporting loads.

**PICK-AND-PLACE**
The loading/unloading an overhead system using automated modules or robots.

**POWER & FREE**
Overhead conveyor incorporating multiple tracks, generally one over the other. The lower track supports the load carrying trolleys while the power chain is suspended from the upper track.

**POWER DOG**
The forward tooth or "dog" on a free trolley of a power and free conveyor that will place the free trolley in motion.

**POWER ONLY**
One track system with chain propelling the trolleys from which the product is suspended.

**PRESSURE ROLLER**
A hardened tubing with integral bearings used to align the power chain to the centerline of the track. Also known as a segment roller.

**PUSHER DOG**
A tooth or "dog" on the power chain of a power and free conveyor that, when engaged with the power dog of a free trolley, places it in motion.

**RAPID SLIDE**
An UHMW polymer incorporated in an overhead conveyor component to reduce friction.

**RIVETLESS CHAIN**
A completely forged, heat-treated chain of pins, side links and center links which can be assembled or disassembled without the use of tools.

**ROBOT INTERFACE**
At loading/unloading stations welding, painting, assembling or other production stations where an operation is performed by a robot while the conveyor system is functioning.

**ROLL NEST**
Assembly of segment rollers in a straight horizontal frame acting as a backup to the power chain as it is driven by the caterpillar chain dogs.

**ROLLER BANK TURN**
An assembly of segment rollers in a horizontal framed arc conforming to the degree of turn required for the track of an overhead conveyor.

**ROLLER TURN**
Series of vertical rollers mounted in a frame to guide chain around a horizontal curve.

**ROLLER TURN ROLLER**
The vertical roller with integral bearings as used in the roller turn.

**SANITARY PAN**
A trough type guard suspended under overhead systems to prevent contamination. Used in conjunction with a “C’ hook.

**SCREEN GUARD**
Expanded metal or wire mesh with suitable framing steel to provide a trough type guard suspended under the overhead system to safeguard personnel and equipment.

**SCREW TAKEUP**
Assembly of the necessary structural and mechanical parts which provides the means to adjust the length of the power chain by the adjustment of one or more screws.

**SEGMENT ROLLER**
A hardened tubing with the integral bearings used to maintain alignment of the power chain to the centerline of the track.

**SIDE LINK**
That portion of the chain which longitudinally straddles the center link.

**SINGLE VERTICAL CURVE**
Section of track bent in a curve to change direction of a conveyor in the vertical plane.

**SPRING TAKEUP**
A spring actuated assembly of the necessary structural and mechanical parts which provides the means to adjust the length of the chain.

**SPROCKET DRIVE**
Chain driving unit that engages and transmits power to the chain located at a turn.

**STORAGE BANK**
Dedicated or on-line power and free track where loads may be accumulated as a part of the production process or for storage purposes.

**SUPERSTRUCTURE**
Where the hanger steel is connected and transfers the load to the building members.

**SWITCH**
Section of free track that may be horizontally routed off the main track system to a spur for an alternate production, storage or maintenance.

**TRACK**
The I-Beam or channel section upon which trolley wheels roll while being propelled.

**TRACK DROP**
In a power and free conveyor, the dimension from the top of the dual channel free track to the bottom of the power track I-Beam.

**TRACK SHROUD**
A hood-like structure which encases the overhead conveyor track to prevent dust, paint, or chemicals from coming into contact with the overhead track, power chain and trolleys.

**TRACTION WHEEL**
A smooth, straight-face wheel which guides the chain around a horizontal curve.

**TRACTION WHEEL TURN**
A mechanism by which the horizontal direction of the conveyor is altered using a smooth, straight faced wheel to maintain the relation of the chain to the track.

**TROLLEY**
Assembly of two half-trolleys and attachment used to support and move suspended loads and carry the connecting and conveying chain.

**TROLLEY BRACKETS**
Drop forged or pressed steel members to which the trolley wheels are attached with provision for connecting to the chain.

**TROLLEY CONVEYOR**
A series of trolleys supported from an overhead track and connected by chain with load suspended from the trolley. May be designed for single or multiple plane operation.

**TROLLEY WHEEL**
The circular member with integral bearing mounted to the trolley bracket.

**UNIT BRACKET**
Steel bracket with segment roller for changes in direction in horizontal plane of conveyor.

**VARIABLE SPEED DRIVE**
Type of drive designed by which the speed of the conveyor can be changed.

**WHEEL TURN**
Structure with a traction wheel which guides a conveyor chain around a horizontal curve.

**YOKE**
Steel support brackets in that attaches and supports the free rail toe to toe channel track under the overhead I-Beam power track.

## TRACK

Rapid Overhead Conveyors utilize, in both Power Only and Power & Free systems, a high carbon structural shape or a roll formed heat treatable steel track. The Power Only systems use a high carbon I-Beam, S3x5.7, S4x7.7, or S6x12.5 depending on the type of system, or a roll formed heat treatable enclosed track. Power and Free conveyors use the same track as Power Only systems with the addition of high carbon structural channels, C3x4.1, C4x5.6, C6x8.2, C6x12, depending on type of Power & Free system. The track of overhead conveyor systems must sustain all of the load placed on it. As a rule, the track is the limiting factor in the amount of load an overhead conveying system will handle, providing the header and hanger steel have been properly designed and installed. The lower flange of the track must withstand the load and were imparted to it from the conveying trolleys without undue peening or deformation.

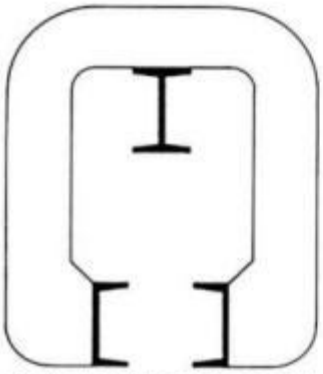
Rapid Overhead Power Only conveyors are offered in enclosed track (Rapid Flex), 3", 4", & 6" track sizes while the Rapid Flow Power & Free overhead conveyors are available in Enclosed Track over 3" channel (Q Flex), 3" I Beam over 3" channel, 4" I Beam over 4" channel, & 4" I Beam over 4" channel as well as custom sizes.

POWER ONLY TRACK

ENCLOSED TRACK

I BEAM
3", 4" & 6"

Q FLEX
POWER & FREE

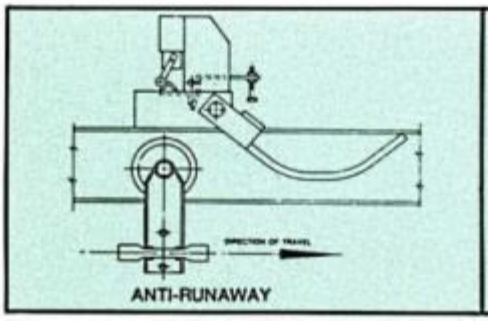


RAPID FLOW POWER & FREE
3"x3", 4"x4" 4"x6"

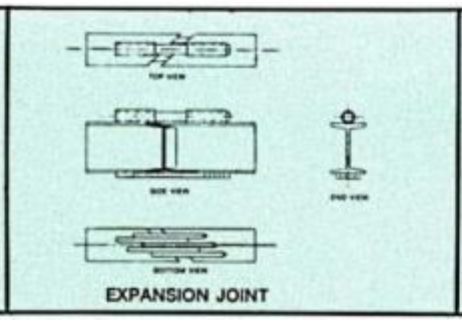
RAPID FLOW PLUS
4"x4"

## TRACK ACCESSORIES

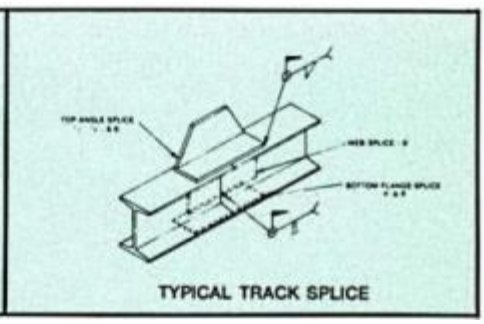
Track accessories for the Rapid Power Only and Rapid Flow Power & Free overhead conveyors include a variety of mechanical devices, either manually or automatically operated, that control the trolley's direction and position in the system. These include push across transfers, track expansion joints, track splices, switches, anti-backups, anti-runaways, stops, drop lift sections, bank and accumulating tracks, either singular or parallel, and other miscellaneous controls and devices. Examples of some of these are shown below.



ANTI-RUNAWAY



EXPANSION JOINT



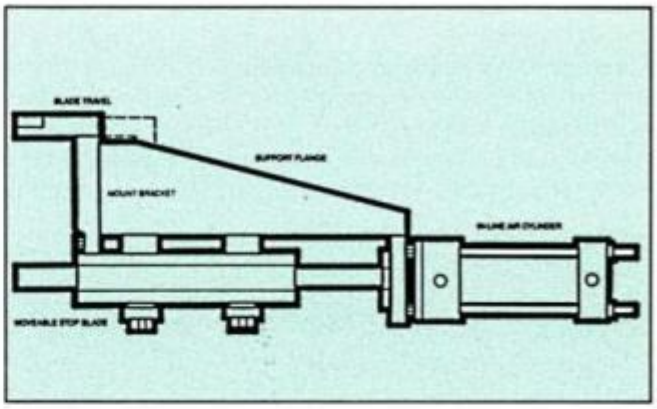
TYPICAL TRACK SPLICE

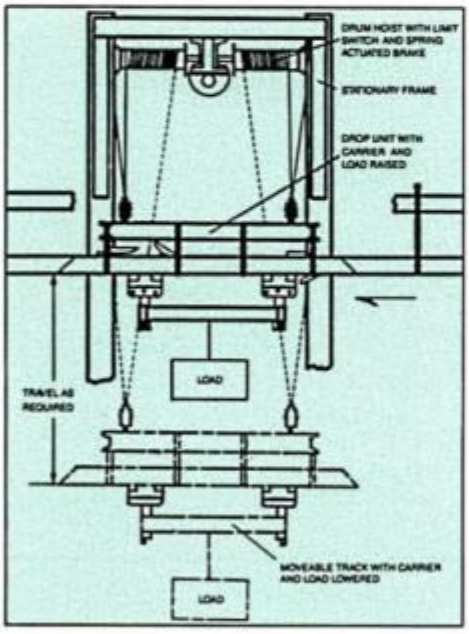
## TRACK ACCESSORIES

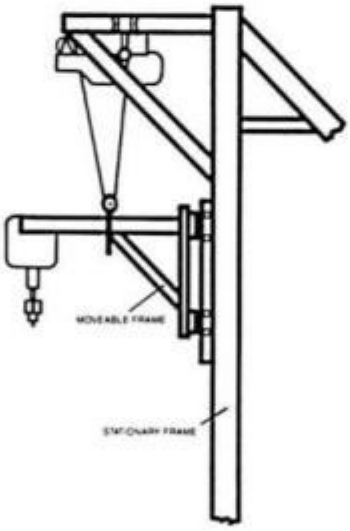
### RAPID FLOW™ POWER & FREE TROLLEY STOP

RAPID FLOW™ Power & Free Trolley Stops may be located at any point on the free track where free trolleys are required to stop or accumulate. They are available in many designs and styles.

To stop movement of a load, RAPID FLOW™ Trolley Stops disengage free trolleys from the power chain. The stop blade extends until it is positioned in the path of the power dog on a leading free trolley. The power dog pivots as it makes contact with the stop blade until it becomes completely free of the side link pusher dog. Subsequent trolleys disengage similarly when each power dog contacts a beaver tail (refer to accumulation page). To resume movement of the trolleys, the stop blade is simply retracted.





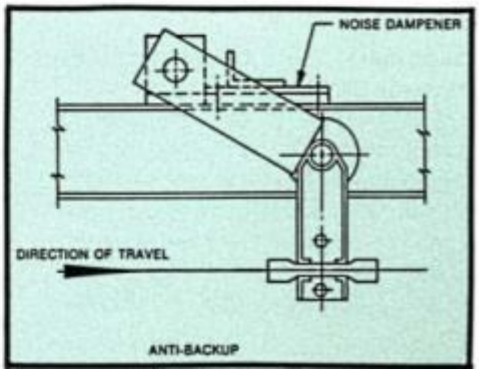




### RAPID FLOW™ POWER & FREE DROP SECTIONS

Rapid Industries RAPID FLOW™ Power & Free Drop Sections are commonly used to lower loads for loading, unloading or processing of materials. Rapid Flow Drop Sections feature heavy-duty welded steel frames and reliable moving parts. Standard and custom designs featuring hydraulic, pneumatic or electric motors are available to suit most any application. In operation, the power track remains stationary and as the free track is lowered, the free trolleys may be held in place by stop assemblies on both ends. Stop assemblies are also provided on the open ends of the free track to prevent items being conveyed from traveling over the ends of the open track. After the trolleys are lifted into the normal position, the stop blade retracts and the load moves on.

### ANTI-BACKUPS

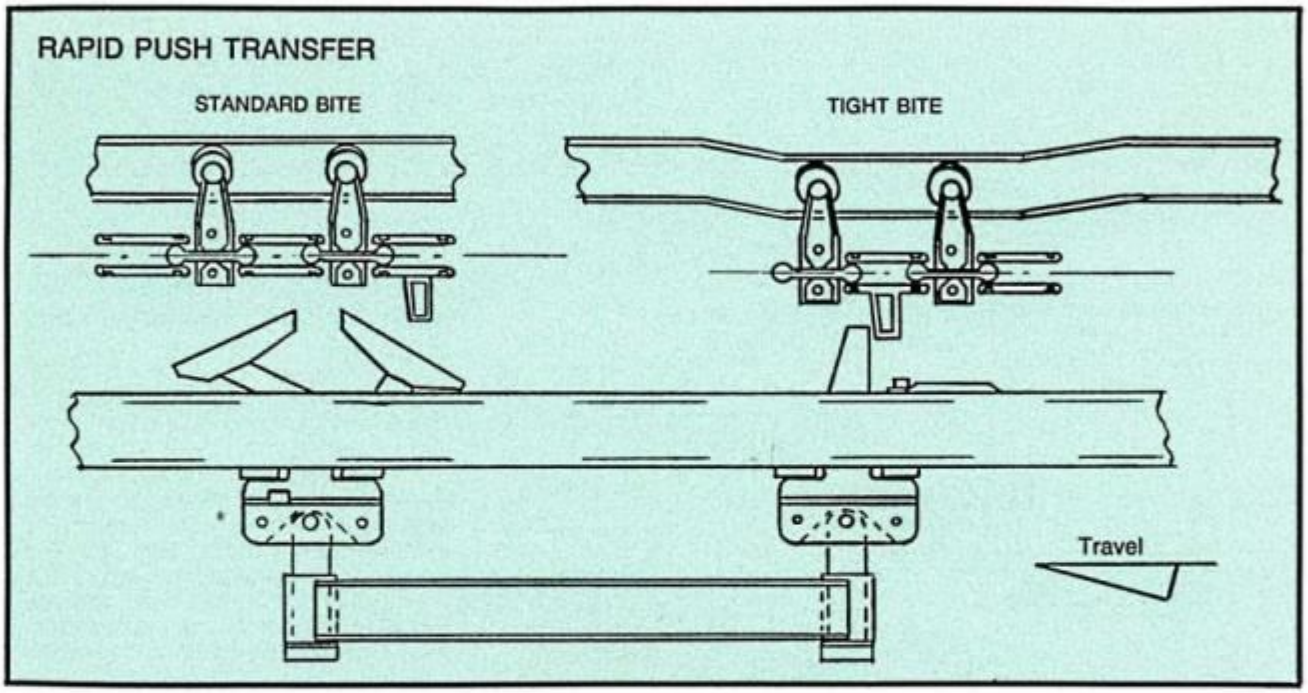
Anti-backups are used as a precaution in the event of a possible chain breakage due to overloads or jams. An anti-backup is a counterweighted device that is mounted on the free track of a Rapid Flow Power & Free system and on the power track of a Rapid Power Only system by a pivot. In normal operation, the trolleys push the anti-backup out of its path and after the trolley has passed, the anti-backup returns to its position. In the event of chain breakage, the anti-backup will engage the trolley bracket or the body of the trolley and prevent reverse conveyor travel. Electrical limit switches are often incorporated into the anti-backup device to shut down the electrically powered drive of the conveyor.



## RAPID FLOW™ POWER & FREE PUSH TRANSFER

A Transfer in a Power & Free overhead conveyor is a device used to move or transfer a power & free trolley from one pusher dog on a power chain to the pusher dog on another power chain. The push transfer utilizes the pusher dog of the power chain to make the transfer.

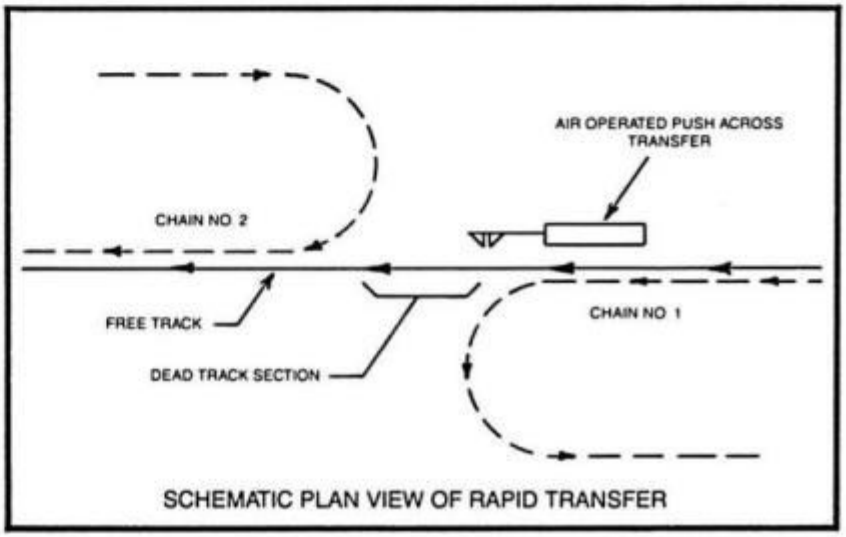
The first conveyor has a quick drop section installed in the proper position to allow the pusher dog on the first chain to engage the transfer dog on the trailing free trolley. After the leading free trolley has been released at the transfer point, the carrier is then pushed by the rear free trolley a sufficient distance to permit the leading free trolley to engage the pusher dog on the second conveyor. This permits the two conveyors to operate completely independent of each other. In most cases, no interlocking, pusher dog synchrunization, or speed relationship is required.




### AIR OPERATED TRANSFER

The RAPID FLOW™ Rapid Air Cylinder Transfer provides a simple, positive method for transferring a power and free carrier from one power chain to another. This heavy-duty low maintenance design enables carriers to be transferred through a switch or through an in-line chain to chain transition.

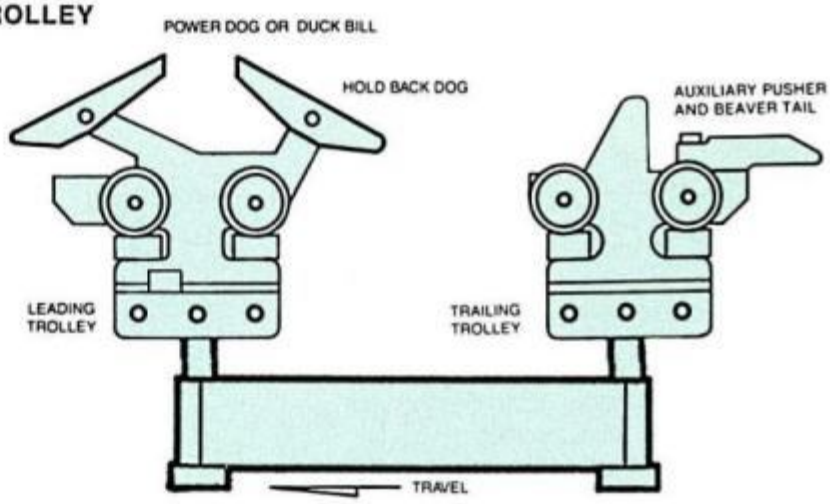
In operation, the accumulating trolley is driven into the air operated transfer by Chain No. 1. As Chain No. 1 disengages from the pusher dog, the air operated transfer extends to push the carriers across the dead track area. The trolleys are freed from the transfer mechanism to engage with the side link pusher dog of Chain No. 2.



SCHEMATIC PLAN VIEW OF RAPID TRANSFER

## RAPID FLOW™ POWER & FREE TROLLEY ARRANGEMENT

RAPID FLOW™ Free Trolleys are designed to carry a load up to 2500 lbs. and run in a steel channel track located under the chain track. The trolleys are assembled into sets, as shown here, with possibilities of several intermediate trolleys. The combination of trolleys in each set is dependent on the weight and the dimension of the load to be carried.




## RAPID FLOW™ POWER & FREE TROLLEY ASSEMBLIES

All RAPID FLOW™ Free Trolleys consist of a steel body equipped with load wheels, guide wheels, and a protective bumper. This protective bumper effectively relieves the power dog assemblies and their shafts and bushings from damaging impacts during accumulation. The RAPID FLOW™ Free Trolley also features simple, heavy-duty construction and interchangeable parts between the leading, intermediate and trailing assemblies.

### Wheels

Selection of proper wheels insures reliability. Both the retainer type ball bearing wheels for standard applications and the full ball compliment wheels for extreme conditions are available. Our engineers can advise to suit your application.

### Leading Trolley

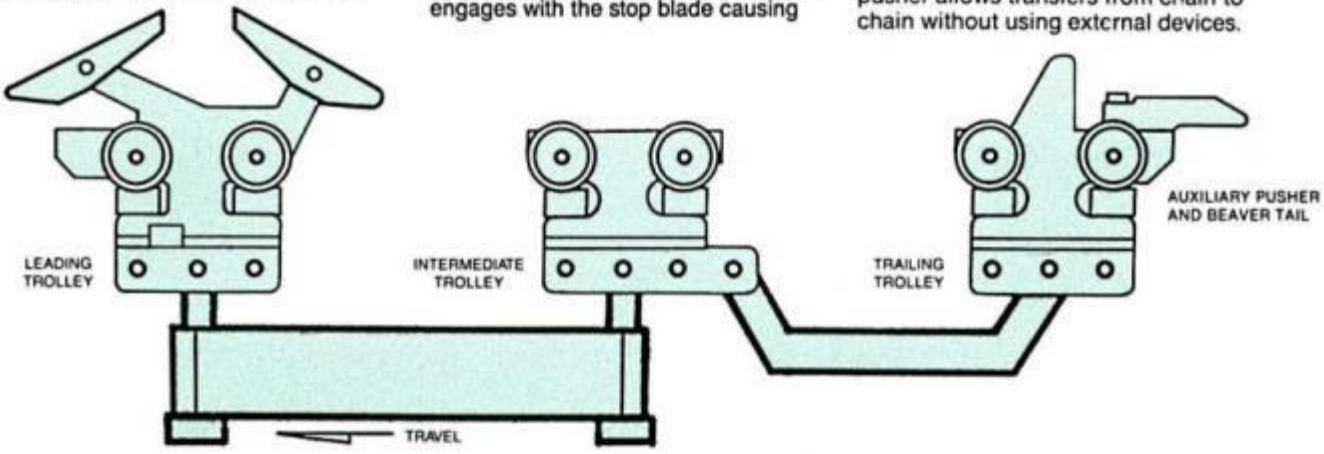
The leading trolley consists of a standard body with power dog and hold-back dog assemblies; each is normally in the driving position, as shown above. The side link pusher dog passes over the hold-back dog and becomes trapped on the power dog thus driving the trolley forward. To disengage the free trolley, a stop blade is incorporated, which is positioned in the path of the power dog. The power dog pivots as it engages with the stop blade causing the trolley to become free from the sidelink pusher dog. The free trolley will remain stationary until the stop blade is removed.

### Intermediate Trolley

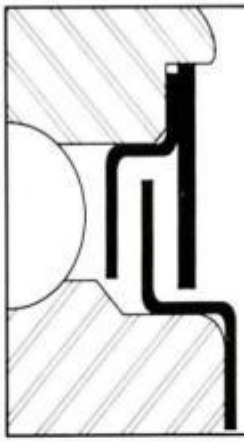
This is a standard body which is always fitted between the leading and the trailing trolleys and is used for supporting long or heavy loads.

### Trailing Trolley

This free trolley consists of a standard body, auxiliary pusher and beaver tail. The beaver tail allows accumulation by causing the same action as the free trolley stop blade. The auxiliary pusher allows transfers from chain to chain without using external devices.



**6" 4" 3"** Rapid trolleys are offered in 6-inch, 4-inch, 3-inch and 2-inch sizes with a variety of options. The 6-inch, 4-inch and 3-inch trolleys are available in either full ball complement or retainer configurations. The full ball complement trolley wheel contains the maximum number of precision ball bearings and is designed for heavy duty and/or high heat applications. The retainer type trolley wheel has each precision ball bearing separated and equally spaced around the periphery of the bearing race by a two piece steel retainer cage. The retainer type wheel is designed primarily for transportation and parts delivery systems. It is generally not suited for heavy duty or high heat applications.



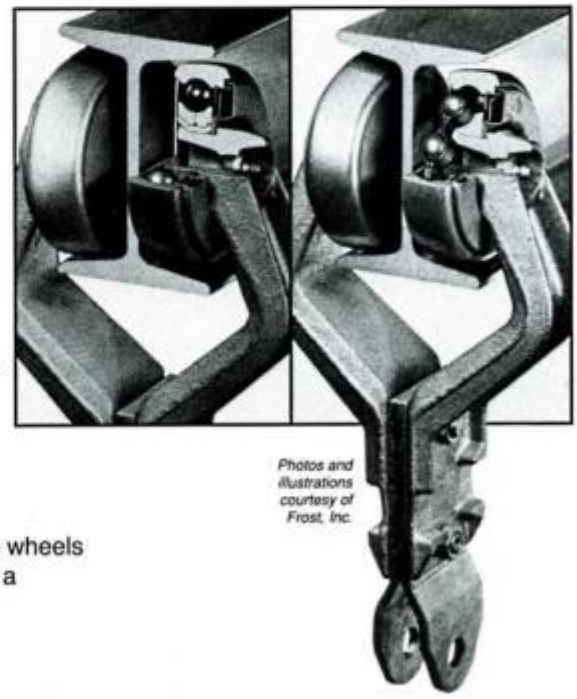
## Featuring Rapid Seals

The Rapid 'Dirt Stopper' seal is a triple labyrinth design with three (3) alternating shields to keep lubricants in and contamination out under normal operating conditions. Outer and inner shields rotate around the stationary middle shield forcing dirt to travel in five (5) directions before it can pass through the 'Dirt Stopper' seal protecting the grease supply in the bearing cavity.

Regular scheduled lubrication must be maintained on all Rapid trolley wheels for optimum performance and long life. The open wheel configuration with no seals or one seal on either side of the wheel is well suited for automatic spray mist lubrication. The Rapid 'Dirt Stopper' seal can be relubed either manually or automatically. Be sure to consult your lubrication supplier for the proper lubricant and *remember not to over lubricate.*

The inner and outer bearing raceways on both full ball complement and retainer type wheels are constructed from high quality carbon steel manufactured and heat treated to a minimum of Rockwell C-58 hardness for maximum performance, longer life and minimum maintenance. Both types of trolleys are swaged to the trolley bracket.

Rapid retainer type trolley wheels are offered with Rapid seals only. Rapid full ball compliment trolley wheels are available with or without Rapid seals (sealed or open configuration). The open type configuration is used primarily for oven applications or where spray mist lubrication is desired.

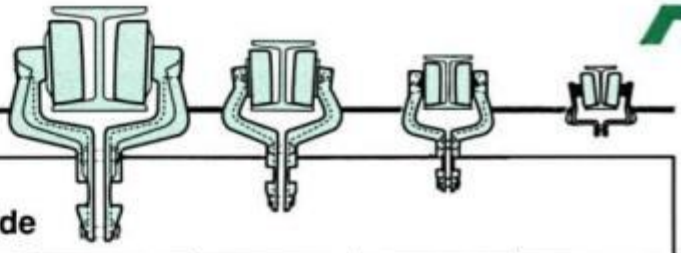


*Photos and illustrations courtesy of Frost, Inc.*

Drop forged, high strength steel brackets are attached to the wheels by riveting or swaging. All Rapid brackets are designed with a ribbed construction for maximum strength.

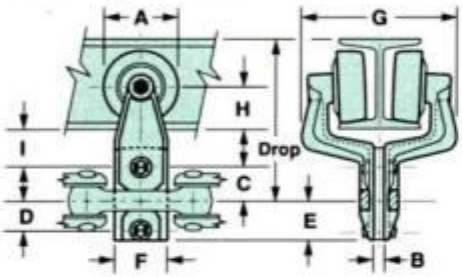
**2"** Rapid 228 trolleys are available in full ball complement with machined race ways with a single row of ball bearings. They have drop forged, zinc plated brackets. The full ball wheel with machined race ways are offered in sealed or open configuration. The brackets are attached to the wheels by bolting. The sealed style has a zerk fitting for re-lube. This trolley is an excellent performer in conditions up to 450°F.

## TROLLEY SIZES



Rapid has a full line of trolleys and accessories to fit every application. By selecting the proper size and type of trolley, attachments, load bars and chain, Rapid can supply the components for an entire system ranging from a light duty, clean environment to an extremely heavy duty, harsh environment.

Select your system from the chart, or call our Engineering Department for quick, efficient solutions to your most complicated materials handling problems.




### Trolley Size Selection Guide

| Trolley Size | | 6" | 4" | | 3" | 2" |
|---|---|---|---|---|---|---|
| Single Trolley Capacity | | 1200 lbs | 400 lbs | | 200 lbs | 125 lbs |
| Trolley Capacity With Load Bar | | 2400 lbs | 800 lbs | | 400 lbs | 250 lbs |
| Chain Size | | X-678 | X-458 | | X-348 | X-228 |
| I-Beam | | S6" x 12.5 lbs/ft. | S4" x 7.7 lbs/ft. | | S3" x 5.7 lbs/ft. | S2⅝" x 3.7 lbs/ft. |
| Drop | | 10" | 8" | 7 3/16" | 5 1/2" | 4 1/2" |
| Trolley Dimension | A | 4 13/16" | 3 3/16" | 3 3/16" | 2 5/16" | 1 15/16" |
| | B | 1/2" | 3/8" | 3/8" | 1/4" | 1/4" |
| | C | 1 5/8" | 1 5/16" | 1 5/16" | 1" | – |
| | D | 1 1/8" | 13/16" | 13/16" | 7/8" | – |
| | E | 1 11/16" | 1 1/4" | 1 5/16" | 1 1/4" | – |
| | F | 3 3/8" | 2 1/8" | 2 1/8" | 1 9/16" | 1" |
| | G | 6 7/8" | 5 3/8" | 5 3/8" | 4 1/16" | 4 11/16" |
| | H | 2 11/16" | 1 7/8" | 1 7/8" | 1 7/16" | 1 3/16" |
| | I | 2 3/8" | 2 11/16" | 1 7/8" | 1 1/2" | – |

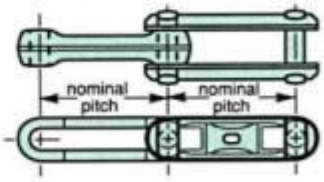
### Approx Wt./Ft.-Chain & Trolleys

| | | | | | |
|---|---|---|---|---|---|
| **Rapid 6" Trolleys - X678 Chain** | | | | | |
| Trolley Spacing (in.) | 12 | 24 | 36 | | |
| Weight Per Ft. (lbs.) | 25.1 | 15.8 | 12.7 | | |
| **Rapid 4" Trolleys - X458 Chain** | | | | | |
| Trolley Spacing (in.) | 8 | 16 | 24 | 32 | |
| Weight Per Ft. (lbs.) | 12.2 | 7.7 | 6.2 | 5.5 | |
| **Rapid 3" Trolleys - X348 Chain** | | | | | |
| Trolley Spacing (in.) | 6 | 12 | 18 | 24 | 30 |
| Weight Per Ft. (lbs.) | 8.3 | 5.2 | 4.2 | 3.7 | 3.4 |
| **Rapid 2" Trolleys - X228 Chain** | | | | | |
| Trolley Spacing (in.) | 8 | 12 | 16 | 20 | 24 |
| Weight Per Ft. (lbs.) | 3.0 | 2.7 | 2.4 | 2.1 | 1.8 |

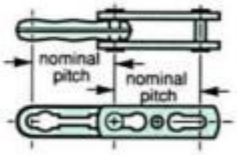
## CHAIN

Drop forged rivetless chain for Power Only and Power and Free conveyors, has a high strength to weight ratio, is extremely flexible in both horizontal and vertical planes, is easy to assemble without tools, and remains intact while in service with minimum maintenance.

X-Type Rivetless (6", 4", 3")




Regular Rivetless (2")




| Nominal Pitch (Theoretical) | Part No. | Ultimate Strength Pounds x 1000 | Assembled Weight Pounds Per Foot |
|---|---|---|---|
| 6" | X678 | 85 | 6.7 |
| 4" | X458 | 48 | 3.2 |
| 3" | X348 | 24 | 2.2 |
| 2" | X228 | 6 | .75 |

| Horizontal Turns - Min. Sizes | | |
|---|---|---|
| Type | Light C.P. | Maximum C.P. |
| Roller Wheel | 36" Rad. 36" Dia. | 48" Rad. 48" Dia. |
| Roller Wheel | 18" Rad. 24" Dia. | 24" Rad. 36" Dia. |
| Roller Wheel | 18" Rad. 24" Dia. | 18" Rad. 24" Dia. |
| Roller Wheel | 18" Rad. 12" Dia. | 24" Rad. 36" Dia. |

| Chain Pull Capacity | |
|---|---|
| Recommended Max. Chain pull for long life | Maximum Chain Pull Intermittent |
| 4500 lbs | 6500 lbs |
| 2500 lbs | 3500 lbs |
| 1500 lbs | 2000 lbs |
| 400 lbs | 600 lbs |

| Verticle Curves - Minimum Radius | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Trolley Spacing (inches) | | | | | | | | |
| 8 | 12 | 16 | 18 | 20 | 24 | 30 | 32 | 36 |
| – | 12ft. | – | – | – | 15ft. | – | – | 20ft. |
| – | – | 8ft. | – | – | 10ft. | – | 12ft. | – |
| – | 5ft. | – | 8ft. | – | 8ft. | 10ft. | – | – |
| 2ft. | 3ft. | 4ft. | – | 6ft. | 8ft. | – | – | – |

## CHAIN LOADING SPECIFICATIONS

Allowable chain loading (pull) providing maximum chain life is dependent on the design and environment of the application. The following are condition descriptions which are used to define allowable chain loads (pull) in given environments.

**CONDITION 1** **IDEAL** - Approximately 20 directional changes per drive. Temperatures to 250° F. No adverse environmental conditions. The radii of horizontal turns and vertical curves are as recommended for good system design. Linear speed is less than 120 feet per minute. Proper lubrication and maintenance procedures are used.

**CONDITION 2** **TYPICAL** - Conservative design using lower chain pull. The design and environment criteria as described in Condition No. 1 are used resulting in longer chain life.

**CONDITION 3** **SEVERE** - Horizontal turns and vertical curves are the minimum allowable radii. System has many directional changes. Heavy individual loads and large elevation changes result in severe reactional loading. Adverse environmental conditions such as temperatures exceeding 250° F, concentrated alkalies and/cr acids present, dusty and dirty condtions, humidity changes, etc.

## CHAIN LOADING SPECIFICATIONS

| CHAIN NUMBER | SYSTEM SIZE | AVERAGE PITCH | AVERAGE ULTIMATE STRENGTH | ALLOWABLE CHAIN PULL/CONDITIONS | | |
|---|---|---|---|---|---|---|
| | | | | 1. (IDEAL) | 2. (TYPICAL) | 3. (SEVERE) |
| X-228 | 2" | 2.00" | 6,500 lbs. | 500 lbs. | 600 lbs. | * |
| X-348 | 3" | 3.015" | 24,000 lbs. | 2,000 lbs | 1,400 lbs. | * |
| SL-348† | 3" | 3.015" | 24,000 lbs. | 2,000 lbs. | 1,400 lbs. | * |
| X-458 | 4" | 4.031" | 48,000 lbs. | 2,500 lbs. | 2,200 lbs. | * |
| X-678 | 6" | 6.031" | 85,000 lbs. | 6,000 lbs. | 4,000 lbs. | * |

* Allowable Chain Pull To Be Determined By Individual System.
† Designation Of Sanitary Link Chain Of C. L. Frost & Son, Inc.

### CATERPILLAR DRIVE CHAINS AND SPROCKETS

Rapid Industries, Inc., stocks caterpillar drive chain with drop forged dogs in standard ten feet lengths for rivetless chain size X-228, X-348, X-458, and X-678. Rapid RC (see chart) caterpillar chain sprockets are machined and are either keyseated for the output shaft of the reducer or fitted with opposing tappered roller bearings for the takeup or idler shaft. Sprockets flame cut from 1045 plate with the tooth profiles for 3 inch, 4 inch and 6 inch rivetless chain are available to suit your requirements for sprocket drives. The following table gives the number of dogs in a ten feet length of cat chain and the centers upon which the dogs are spaced for various rivetless chain sizes.

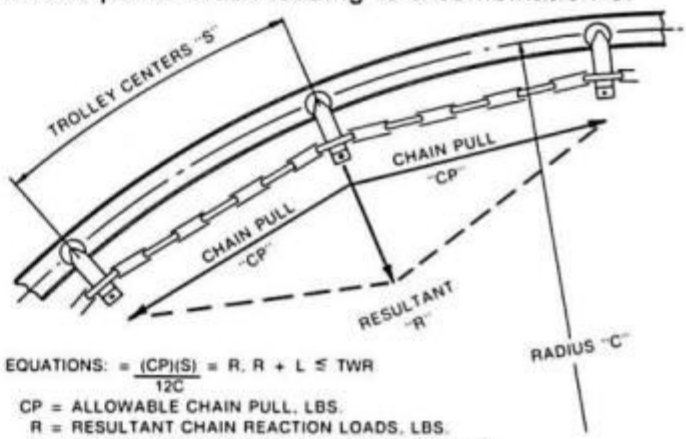
Complete dimensional data of normally stocked cat chain, cat chain sprockets, and sprocckets for rivetless chain used on sprocket drives to meet your requirements may be found in Rapid's Conveyor Catalog.

| Chain Size | Number of Dogs | Ctrs. | Length | Chain Type |
|---|---|---|---|---|
| 228 | 22 | 4" | 7'-4" | RC-80 |
| 348 | 10 | 12" | 10'-0" | RC-120<br>RC-160 |
| 458 | 15 | 8" | 10'-0" | RC-160 |
| 678 | 10 | 12" | 10'-0" | RC-160 |

## ALLOWABLE TROLLEY LOADS AND CHAIN PULL (INTERRELATED)

The allowable trolley loads and chain pull are interrelated and limited by the track (I-Beam) load capacity. This track load capacity is known as "Track Wear Rating" (TWR), because loading above this limit will cause "grooving" of the beam flanges at the trolley wheel contact point. Track loading is a combination of trolley loads (L) plus chain reaction loads (R).

At vertical curves, the chain exerts an additional force on the trolleys and the track flanges. This resultant (R) force acts toward the center of curvature of the vertical curve, and is additive to the force exerted by the trolley loads (L) (live load plus carrier) on the trolley wheels and track flanges. When selecting multiplane trolley conveyors, consider these factors and make selections that keep the track flange loads within recommended limits . . . Track Wear Rating (TWR) = Load Limit Without Damage to the Track.




EQUATIONS: $= \frac{(CP)(S)}{12C} = R$, $R + L \leq TWR$

CP = ALLOWABLE CHAIN PULL, LBS.
R = RESULTANT CHAIN REACTION LOADS, LBS.
L = TROLLEY LOADS (LIVE LOAD AND CARRIER) LBS.
C = VERTICAL CURVE RADIUS, FT.
S = TROLLEY CENTERS, IN.
TWR = TRACK WEAR RATING, LBS.

| I-BEAM SIZE | TROLLEY DESIGN | TWR |
|---|---|---|
| 3" | Sani-Trolley® Thermo-Plastic Wheel | 200 lbs. |
| 3" | Standard Steel Wheel | 450 lbs. |
| 4" | Standard Steel Wheel | 800 lbs. |
| 6" | Standard Steel Wheel | 1,600 lbs. |

The chain reaction loads (R) are a substantial portion of TWR, in multiplane systems, reducing the allowable trolley live loads. The following chart is a "rule of thumb" guide line for the maximum "live load" or "swing weight" of the Track Wear Rating (TWR).

| I-BEAM SIZE | TROLLEY DESIGN | L |
|---|---|---|
| 3" | Sani-Trolley® Thermo-Plastic Wheel | 150 lbs. |
| 3" | Standard Steel Wheel | 200 lbs. |
| 4 " | Standard Steel Wheel | 400 lbs. |
| 6" | Standard Steel Wheel | 1,200 lbs. |

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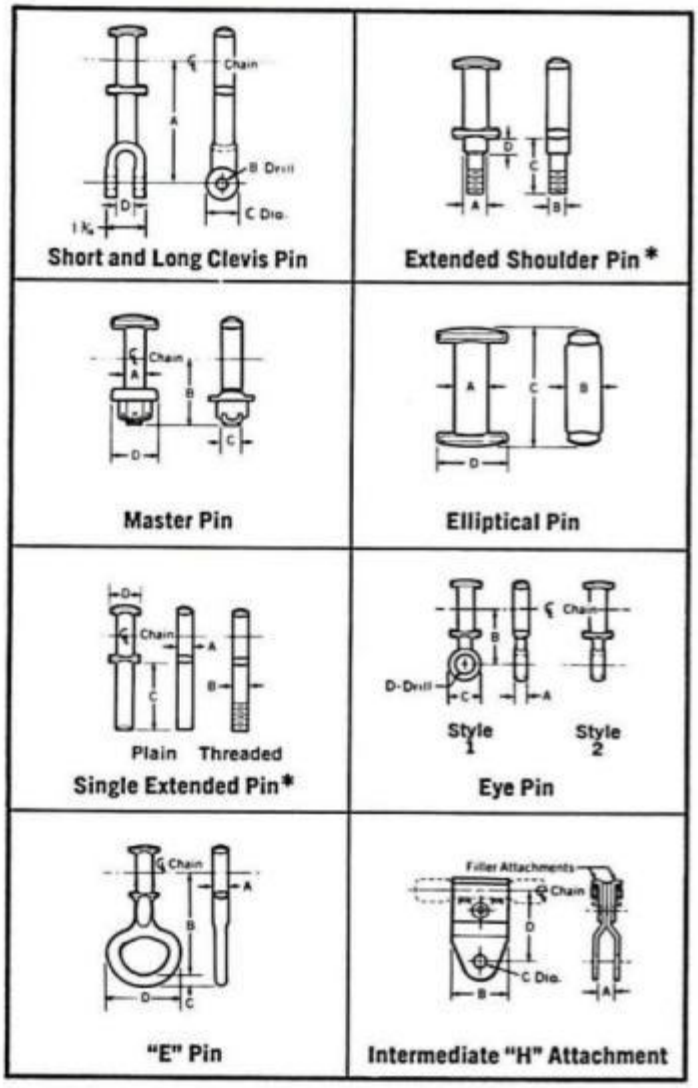
## TROLLEY SPECIFICATIONS

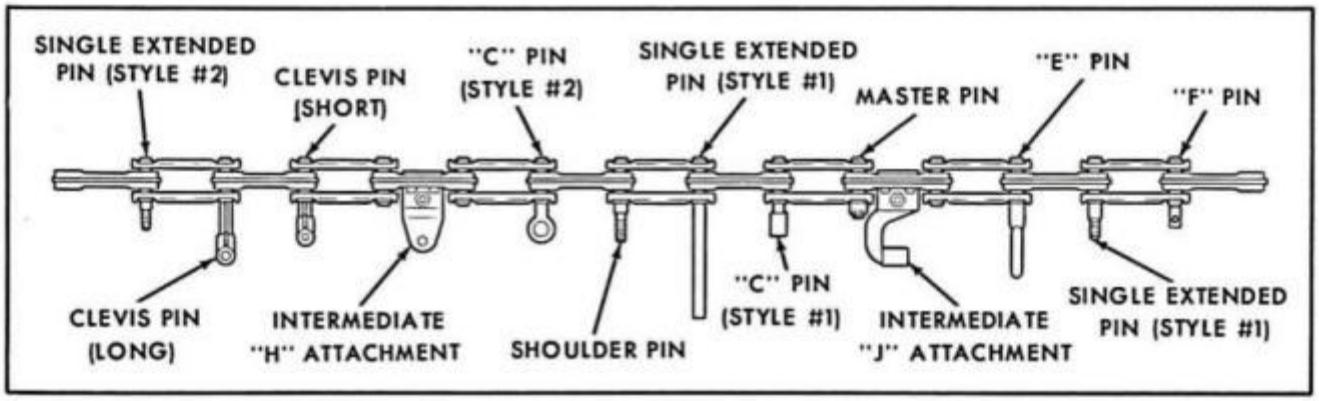
| Trolley | Drop | Max. Load | Min. Spacing | Max. Spacing | I-Beam Size | Chain Size | Weight* |
|---|---|---|---|---|---|---|---|
| 3" Vertical | 5 1/2" | 200 Lbs. | 6" | 30" | 3" | X-348 | 2.6 Lbs. |
| 4" Vertical | 8" or 7 3/16" | 400 Lbs. | 8" | 32" | 4" | X-458 | 5.3 Lbs. |
| 4" Horizontal | 8" | 400 Lbs. | 8" | 32" | 4" | X-458 | 5.4 Lbs. |
| 6" Vertical | 10" | 1200 Lbs. | 12" | 36" | 6" | X-678 | 17.0 Lbs. |
| 6" Horizontal | 10" | 1200 Lbs. | 8" | 32" | 6" | X-458 | 15.4 Lbs. |

*Two halves less attachments.

## CHAIN ATTACHMENTS



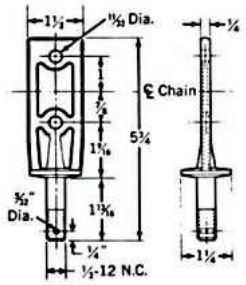

| Part | Chain | A | B | C | D |
|---|---|---|---|---|---|
| Short Clevis | 348 | 2 1/2 | 25/64 | 15/16 | 9/16 |
| | 458 | 3 | 25/64 | 15/16 | 9/16 |
| Long Clevis | 348 | 3 1/8 | 25/64 | 15/16 | 9/16 |
| | 458 | 4 | 25/64 | 1 | 9/16 |
| Master Pin | 348 | 1/2 | 1 7/16 | 3/8 | 1 |
| | 458 | 5/8 | 2 1/8 | 1/2 | 1 7/32 |
| | 468 | 3/4 | 2 5/16 | 5/8 | 1 11/16 |
| | 678 | 7/8 | 2 3/8 | 5/8 | 1 7/8 |
| Elliptical Pin | 348 | 31/64 | 33/64 | 1 3/4 | 1 |
| | 458 | 5/8 | 21/32 | 2 13/64 | 1 7/32 |
| | 678 | 7/8 | 15/16 | 3 3/32 | 1 7/8 |
| Single Extended Pin | 348 | 1/2 | 1/2 | 2 | 1 |
| | 348 | 1/2 | 1/2 | 2 1/8 | 1 |
| | 348 | 1/2 | 1/2 | 4 1/8 | 1 |
| | 458 | 5/8 | 1/2 | 1 1/8 | 1 7/32 |
| | 458 | 5/8 | 1/2 | 1 1/4 | 1 7/32 |
| | 458 | 5/8 | 1/2 | 1 1/4 | 1 7/32 |
| | 458 | 5/8 | 1/2 | 1 5/16 | 1 7/32 |
| | 458 | 5/8 | 1/2 | 1 1/2 | 1 7/32 |
| | 458 | 5/8 | 1/2 | 2 1/2 | 1 7/32 |
| | 458 | 5/8 | 1/2 | 2 5/8 | 1 7/32 |
| | 458 | 5/8 | 1/2 | 4 7/8 | 1 7/32 |
| | 458 | 5/8 | 5/8 | 2 | 1 7/32 |
| | 458 | 5/8 | 5/8 | 3 1/2 | 1 7/32 |
| | 458 | 5/8 | 5/8 | 5 1/2 | 1 7/32 |
| | 678 | 7/8 | 5/8 | 3 | 1 7/8 |
| | 678 | 7/8 | 3/4 | 1 1/2 | 1 7/8 |
| | 678 | 7/8 | 7/8 | 2 1/4 | 1 7/8 |
| Eye Pin | 458 | 1/2 | 2 1/8 | 1 1/4 | 25/32 |
| Intermediate "H" Attachment | 348 | 9/16 | 1 5/8 | 17/32 | 3 1/8 |
| | 458 | 11/16 | 2 1/4 | 17/32 | 2 7/8 |
| Extended Shoulder Pin | 458 | 5/8 | 1/2 | 1 1/2 | 3/8 |
| | 678 | 7/8 | 5/8 | 1 3/4 | 33/64 |
| | 678 | 7/8 | 5/8 | 2 1/8 | 33/64 |
| "E" Pin | 458 | 5/8 | 4 1/4 | 1/2 | 3 |



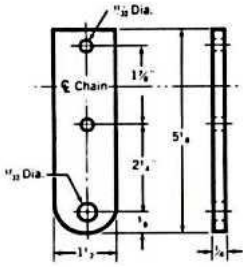
# TROLLEY ATTACHMENTS

## 3-INCH VERTICAL HOLE

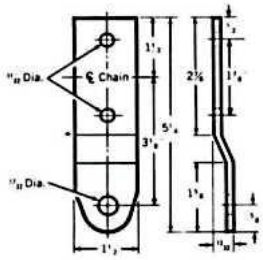
**"B" Attachment**
Weight: .5 lbs.



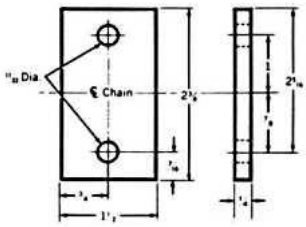

**"C" Attachment**
Weight: .5 lbs.




**"H" Attachment**
Weight: .25 lbs.

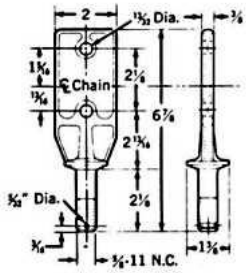



**"I" Attachment**
Weight: .3 lbs.

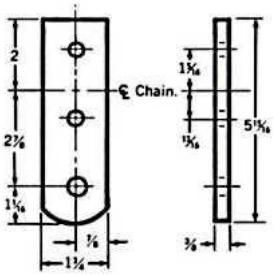



## 4-INCH VERTICAL HOLE

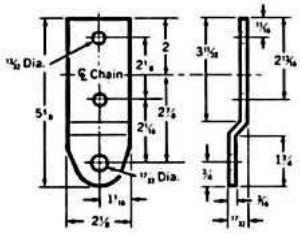
**"B" Attachment**
Weight: 1.0 lb.



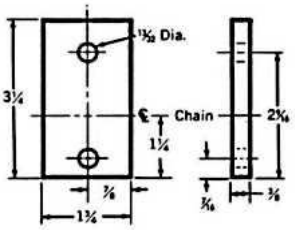

**"C" Attachment**
Weight: .8 lbs.




**"H" Attachment**
Weight: .55 lbs.

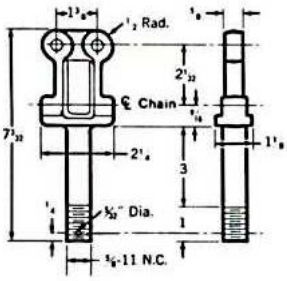



**"I" Attachment**
Weight: .6 lbs.

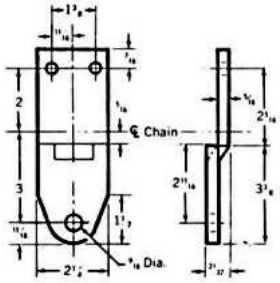



## 4-INCH HORIZONTAL HOLE

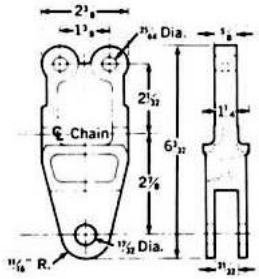
**"B" Attachment**
Weight: 1.4 lbs.



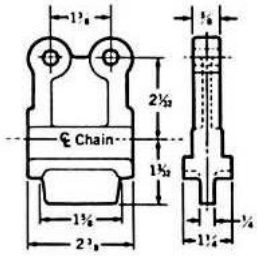

**"H" Attachment**
Weight: 1.1 lbs.




**"H" Attachment**
Weight: 1.6 lbs.

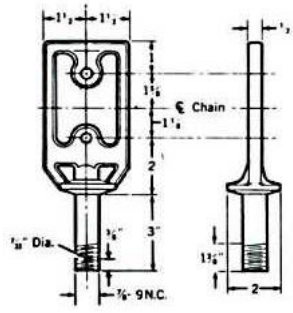



**"I" Attachment**
Weight: 1.1 lbs.

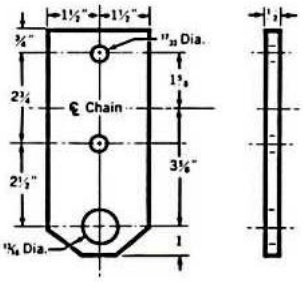



## 6-INCH VERTICAL HOLE

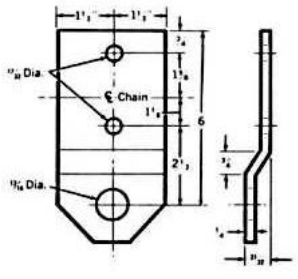
**"B" Attachment**
Weight: 2.8 lbs.



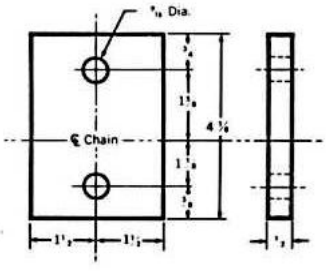

**"C" Attachment**
Weight: 2.7 lbs.




**"H" Attachment**
Weight: 1.4 lbs.




**"I" Attachment**
Weight: 1.7 lbs.

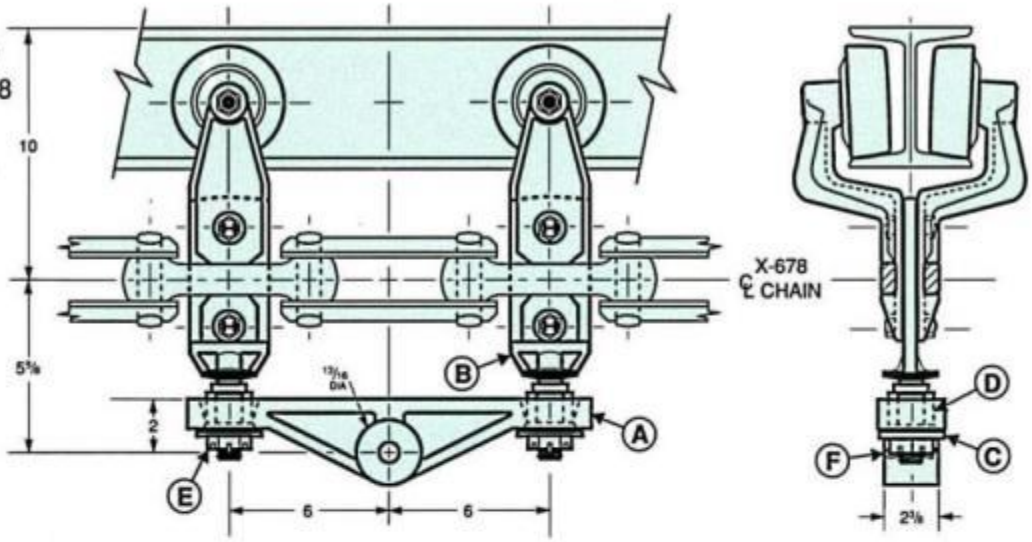



* 2-INCH TROLLEY ATTACHMENTS ALSO AVAILABLE

## LOAD BAR ASSEMBLIES

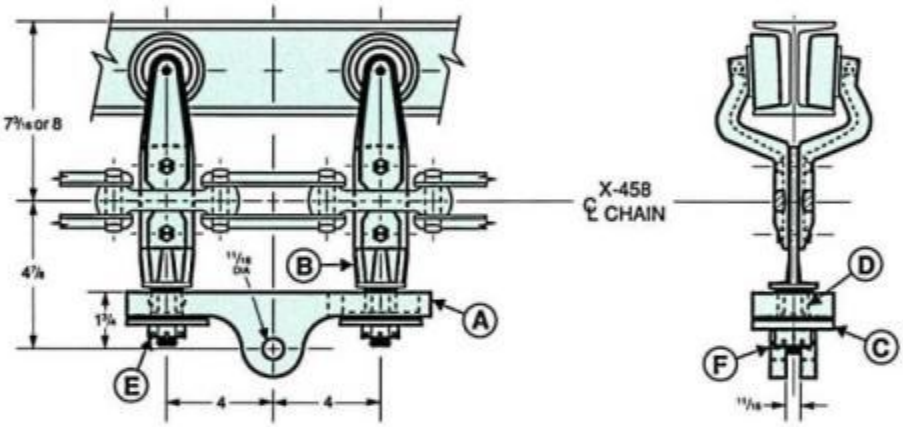
**6"** Load bar assembly for 6" I-beam by X-678 chain has a capacity of 2400 pounds. Order load bar or load bar assembly composed of:

- (A) 1 - 6" Load Bar
- (B) 2 - 6" B Attachments
- (C) 2 - Spherical Washers
- (D) 2 - Tube Spacers
- (E) 2 - Slotted Hex Nuts
- (F) 2 - Cotter Pins



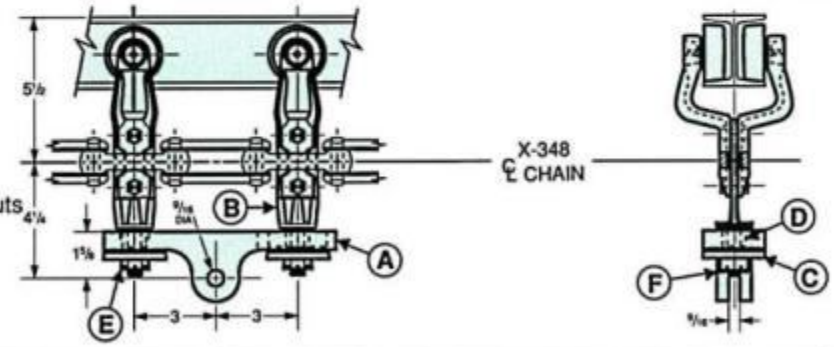

**4"** Load bar assembly for 4" I-beam by X-458 chain has a capacity of 800 pounds.Order load bar or load bar assembly composed of:

- (A) 1 - 4" Load Bar
- (B) 2 - 4" B Attachments
- (C) 2 - Spherical Washers
- (D) 2 - Tube Spacers
- (E) 2 - Slotted Hex Nuts
- (F) 2 - Cotter Pins



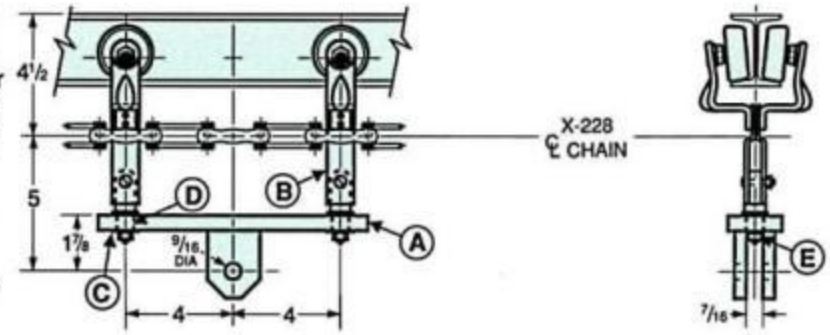

**3"** Load bar assembly for 3" I-beam by X-348 chain has a capacity of 400 pounds. Order load bar or load bar assembly composed of:

- (A) 1 - 3" Load Bar
- (B) 2 - 3" B Attachments
- (C) 2 - Spherical Washers
- (D) 2 - Tube Spacers
- (E) 2 - Slotted Hex Nuts
- (F) 2 - Cotter Pins

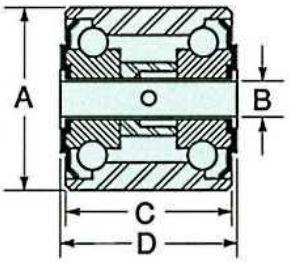



**2"** Load bar assembly for 2-5/8" I-beam by X-228 chain has a capacity of 250 pounds. Order load bar or load bar assembly composed of:

- (A) 1 - 2" Load Bar
- (B) 2 - 2" H Attachments
- (C) 2 - Spherical Washers
- (D) 2 - Tube Spacers
- (E) 2 - Slotted Hex Nuts
- (F) 2 - Cotter Pins
- (G) 2 - Swivel Attachments



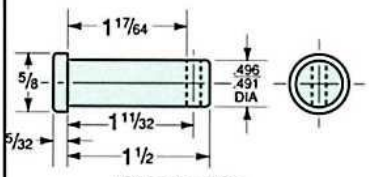
## ROLLERS



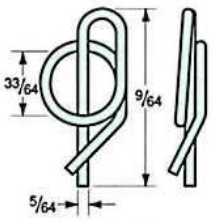

Bushing Type

| Rail Size | Part Number | A O.D. | B Bore | C Face | D Overall | Relubrication Thru | Bearing Weight | To be used with Bolt: |
|---|---|---|---|---|---|---|---|---|
| 2" | 232 | 1-3/4" | 1/4" | 1-3/8" | 1-1/2" | Grease packed | .75 lbs. | 1/4-20 x 2-1/4 Flat head cap screw-or 1/4-20 x 2-3/4 Socket head cap screw |
| 2" | S310 | 2-1/8" | 1/4" | 1-3/8" | 1-1/2" | Grease packed | 1.0 lbs. | |
| 3" | 3051 | 2-3/4" | 1/2" | 1-15/16" | 2-1/8" | Center Pin | 2.4 lbs. | Part No. 3007-8 |
| 4" & 6" | 4051 | 2-3/4" | 1/2" | 2-9/16" | 2-3/4" | Center Pin | 3.1 lbs. | Part No. 4003-8 |
| 4" | 4057 | 2-3/4" | 9/16" | 2-9/16" | 2-3/4" | Center Pin | 3.1 lbs. | Part No. 4012-61 |
| 4" | 4072 | 2-3/4" | 5/8" | 2-9/16" | 2-3/4" | Center Pin | 3.1 lbs. | Part No. 4255-8 |

## PINS

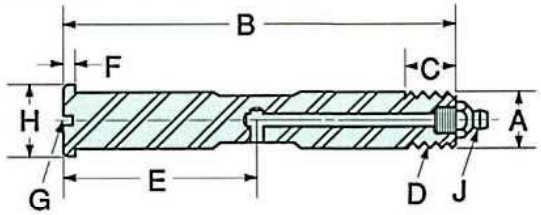



Clevis Pin



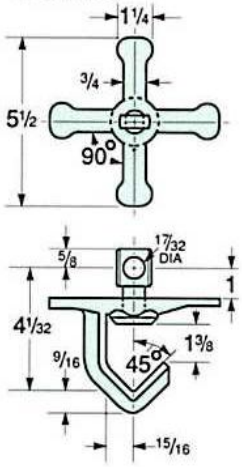

Safety Pin

## ROLLER BOLTS



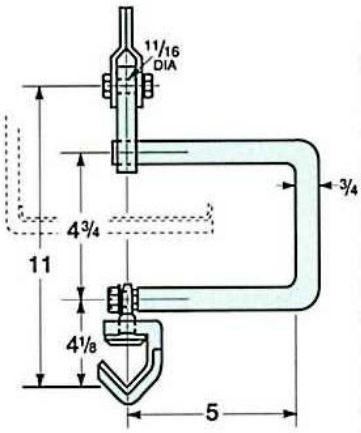

| Part No. | A | B | C | D | E | F | G | H | J |
|---|---|---|---|---|---|---|---|---|---|
| 3007-8 | 1/2" | 3-1/2" | 1/2" | 1/2"-13 | 1-9/16" | 1/8" | 3/32" x 3/32" | 11/16" | 1641-B |
| 4003-8 | 1/2" | 4-5/32" | 5/8" | 1/2"-13 | 1-7/8" | 1/8" | 3/32" x 3/32" | 11/16" | 1641-B |
| 4012-61 | 9/16" | 4-3/16" | 5/8" | 9/16"-18 | 2-1/16" | 1/8" | 3/32" x 3/32" | 3/4" | 1641-B |
| 4255-8 | 5/8" | 4-5/32" | 1/2" | 5/8"-11 | 1-7/8" | 1/8" | 3/32" x 3/32" | 13/16" | 1641-B |

## HOOKS



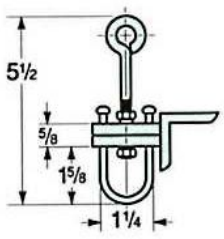

### 90° Star Indexing Swivel

The Rapid star wheel indexing swivel has a 125 pound capacity rating and can be used with X-348 and X-458 trolley H attachments.



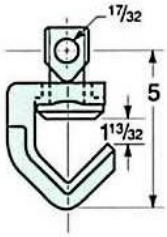

### Rapid Sanitary Hook Assembly

Rapid sanitary hook assemblies have a maximum 250 pound capacity and can be used in either indexing or non-indexing applications.




### Friction Turning Hook

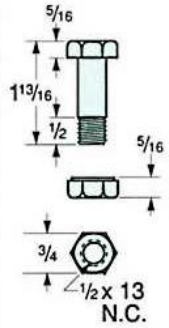
Rapid friction turning hooks have a 75 pound capacity and rotate work by riding against a turn rail.



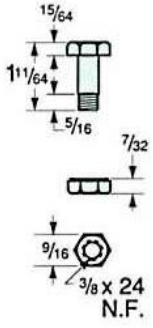

### 90° Indexing Swivel Hook

Rapid indexing swivel hooks have a 300 pound capacity and work with 3" and 4" tracks. 90° index - 180° transverse to chain; 180° parallel to chain.

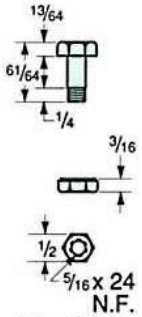
## TROLLEY BOLTS



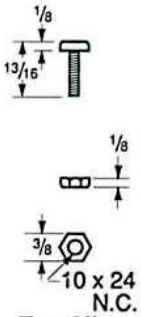

For 6" Trolley




For 4" Trolley




For 3" Trolley




For 2" Trolley

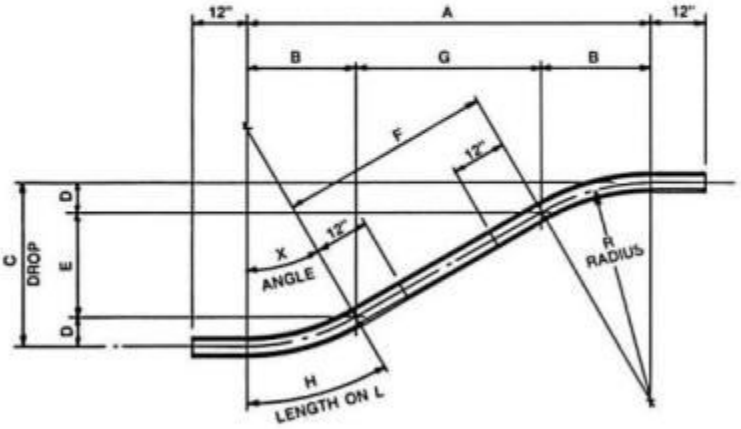
## VERTICAL CURVES

In a multiplane overhead conveyor system where it is required that the track, either Power Only or Power and Free, change elevation, vertical curves, either single or double (Also called "compound curves") are used. The radius of vertical curves must be carefully selected because of the effect of the additional forces incurred by the change of elevation which will be transmitted to the overhead conveyor through the power chain and load bearing trolleys. Vertical curves are usually made as single curves and are field assembled into double or compound curves, using a straight tangent section of track between the curves as is required to meet the change of elevation requirements.

Vertical curves, both incline and decline from the horizontal, are made for all track sizes in both Power Only and Power and Free overhead conveyor systems, to the degree of arc and radius required. Standard arcs are 30° and 45°. The vertical curve radii should be as large as possible and yet consistent with the conveyor layout requirements. Minimum vertical curve radii should be used only when absolutely required and when consideration has been given to imposed trolley loading, chain pull, chain wear, track wear, and possible conveyor line surge.

## VERTICAL CURVE RADII SPECIFICATIONS

| Chain Size | X-348 | | X-458 | | X-678 | |
|---|---|---|---|---|---|---|
| Trolley Spacing | Minimum | Recommended | Minimum | Recommended | Minimum | Recommended |
| 12" | 4'-0" | 5'-0" | | | 6'-0" | 12'-0" |
| 16" | | | 5'-6" | 8'-0" | | |
| 18" | 5'-0" | 6'-6" | | | | |
| 24" | 6'-6" | 8'-0" | 7'-0" | 10'-0" | 11'-0" | 15'-0" |
| 30" | 7'-8" | 10'-0" | | | | |
| 36" | 9'-0" | 12'-0" | 9'-0" | 12'-0" | 16'-0" | 20'-0" |




A = 2B + G
B = R SIN X
C = DROP
D = R - (R COS X)
E = C - 2D

$F = \frac{E}{SIN\ X}$

$G = \frac{E}{TAN\ X}$

H = .017453RX

TRACK LENGTH = 2H + F + 2'-0"

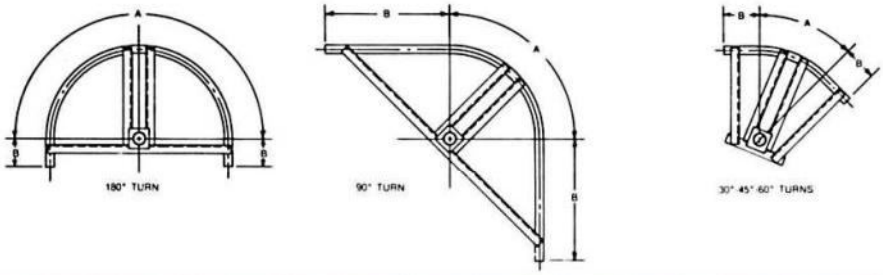
## TRACTION WHEELS AND ROLLER BANK TURNS

Traction wheels, either spoke type of full plate hub, and roller bank turns are used to keep the centerline of the power chain under the center of the I-Beam power rail in horizontal turns in both Power Only and Power and Free overhead conveyor systems. A variety of bearings are offered for the traction wheel's center shaft to meet the conditions of the intended application.

Anti-friction bearing wheels are recommended for moderate speeds and clean, dry operating conditions at temperatures up to 270° F. Tapered roller bearing wheels are recommended for moderate of high speeds and with special lubricants, for exposure to moisture or chemical vapors at temperature up to 270° F. Larger lubricant storage space can be provided to extend lubrication intervals. Carbon graphite bearing wheels are recommended for use in ovens and will withstand temperatures up to 500° F.

Wheel diameters and roller bank turns must be selected large enough to provide clearance between adjacent loads on the overhead conveyor. Traction wheel turns and roller bank turns are available in many standard pitch diameters and arcs, and special turns can be furnished to meet your particular application.

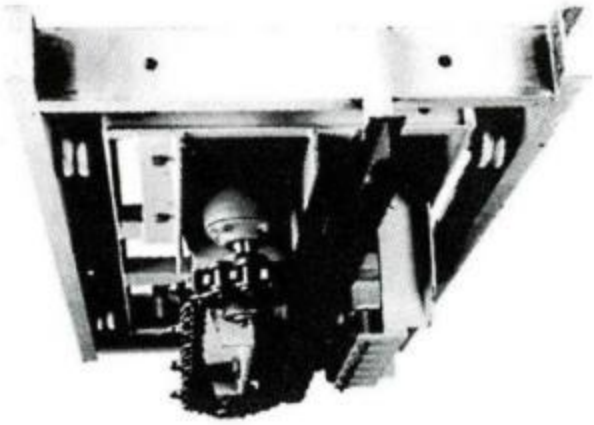
The Rapid Overhead Conveyor component catalog fully details the many diameters and sizes of traction wheels and roller bank turns available. The table below is a summary of these traction wheel and roller bank turns.




| Nom. Diameter | Degrees | 3" I Drop = 5½" | | 4" I 7-3/16" or 8" Drop | | 6" I 10" Drop | |
|---|---|---|---|---|---|---|---|
| | | A | B | A | B | A | B |
| 24" | 30 | 0'-6-5/16" | 1'-0" | 0'-6-5/16" | 1'-0" | | |
| | 45 | 0'-9-7/16" | 1'-0" | 0'-9-7/16" | 1'-0" | | |
| | 60 | 1'-0-9/16" | 1'-0" | 1'-0-9/16" | 1'-0" | | |
| | 90 | 1'-6-7/8" | 2'-0" | 1'-6-7/8" | 2'-0" | | |
| | 180 | 3'-1-11/16" | 1'-0" | 3'-1-11/16" | 1'-0" | | |
| 30" | 30 | 0'-7-7/8" | 1'-0" | 0'-7-7/8" | 1'-0" | | |
| | 45 | 0'-11-3/4" | 1'-0" | 0'-11-3/4" | 1'-0" | | |
| | 60 | 1'-3-11/16" | 1'-0" | 1'-3-11/16" | 1'-0" | | |
| | 90 | 1'-11-9/16" | 2'-3" | 1'-11-9/16" | 2'-3" | | |
| | 180 | 3'-11-1/8" | 1'-0" | 3'-11-1/8" | 1'-0" | | |
| 36" | 30 | 0'-9-7/16" | 1'-0" | 0'-9-7/16" | 1'-0" | | |
| | 45 | 1'-2-1/8" | 1'-0" | 1'-2-1/8" | 1'-0" | | |
| | 60 | 1'-6-7/8" | 1'-0" | 1'-6-7/8" | 1'-0" | | |
| | 90 | 2'-4-1/4" | 2'-6" | 2'-5-1/4" | 2'-6" | | |
| | 180 | 4'-8-9/16" | 1'-0" | 4'-8-9 16" | 1'-0" | | |
| 42" | 30 | 0'-11" | 1'-0" | 0'-11" | 1'-0" | | |
| | 45 | 1'-4-1/2" | 1'-0" | 1'-4-1/2" | 1'-0" | | |
| | 60 | 1'-10" | 1'-0" | 1'-10" | 1'-0" | | |
| | 90 | 2'-9" | 2'-9" | 2'-9" | 2'-9" | | |
| | 180 | 5'-6" | 1'-0" | 5'-6" | 1'-0" | | |
| 48" | 30 | 1'-0-9/16" | 1'-0" | 1'-0-9/16" | 1'-0" | 1'-0-9/16" | 1'-0" |
| | 45 | 1'-6-7/8" | 1'-0" | 1'-6-7/8" | 1'-0" | 1'-6-7/8" | 1'-0" |
| | 60 | 2'-1-1/8" | 1'-0" | 2'-1-1/8" | 1'-0" | 2'-1-1/8" | 1'-0" |
| | 90 | 3'-1-11/16" | 3'-0" | 3'-1-11/16" | 3'-0" | 3'-1-11/16" | 3'-0" |
| | 180 | 6'-3-3/8" | 1'-0" | 6'-3-3/8" | 1'-0" | 6'-3-3/8" | |
| 60" | 30 | 1'-3-11/16" | 1'-0" | 1'-3-11/16" | 1'-0" | 1'-3-11/16" | 1'-0" |
| | 45 | 1'-9-11/16" | 1'-0" | 1'-11-9/16" | 1'-0" | 1'-11-9/16" | 1'-0" |
| | 60 | 2'-7-7/16" | 1'-0" | 2'-7-7/16" | 1'-0" | 2'-7-7/16" | 1'-0" |
| | 90 | 3'-11-1/8" | 3'-6" | 3'-11-1/8" | 3'-6" | 3'-11-1/8" | 3'-6" |
| | 180 | 7'-10-1/4" | 1'-0" | 7'-10-1/4" | 1'-0" | 7'-10-1/4" | 1'-0" |
| 72" | 30 | -- | -- | -- | -- | -- | |
| | 45 | -- | -- | -- | -- | -- | -- |
| | 60 | -- | -- | -- | -- | -- | -- |
| | 90 | 4'-8-9/16" | 4'-0" | 4'-8-9/16" | 4'-0" | 4'-8-9/16" | 4'-0" |
| | 180 | 9'-5-1/8" | 1'-0" | 9'-5-1/8" | 1'-0" | 9'-5-1/8" | 1'-0" |

## DRIVES

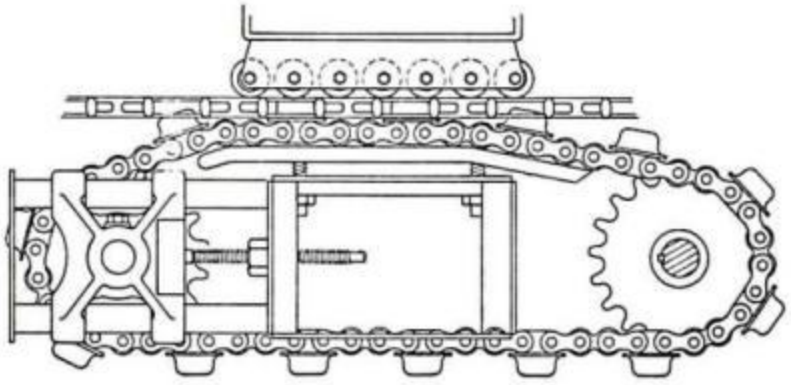
Rapid Overhead Conveyor Power Chain Drives are available in two general types: the caterpillar drive and the sprocket drive. The drive is one of the most important components of an overhead conveyor system. In addition to powering the rivetless power chain of the system, the drive governs the speed of the power chain and thus the rate of production. The selection of the proper type of drive, either caterpillar or sprocket, and the proper size and gear ratio of the speed reducer, is essential in the design of the most efficient and economical overhead conveyor system, either Rapid Power Only or Rapid Flow Power & Free for your application.



### CATERPILLAR DRIVES

Stationary fixed frame Caterpillar Drives are to be located on a straight run of the track at a high point in the conveyor system. The drive must pull, not push, the power chain. Caterpillar attachment components are mounted on a steel frame that bolts to the main drive frame. This type of drive requires an external overload protection device, i.e. shear pin hub, current limiting device, etc.

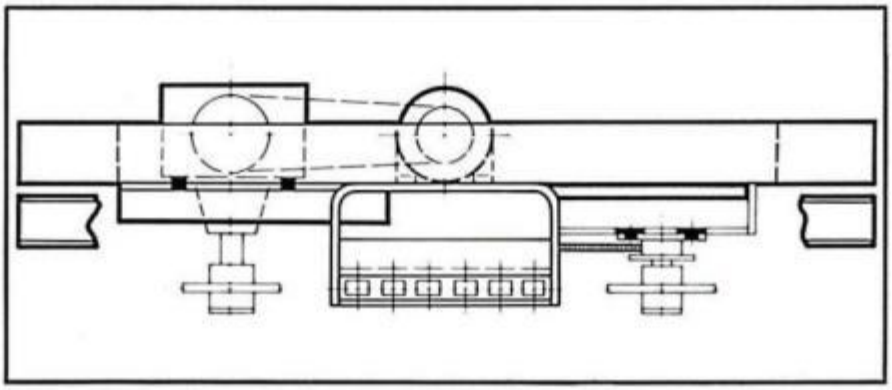
Floating Caterpillar Drives incorporate a system of rollers supporting the drive frame within an enclosed steel stationary frame. Movement of the floating frame is limited by helical springs. The advantage of the floating caterpillar drive is that, through the use of limit switches for overload protection, the replacement of shear pins when the drive is overloaded is no longer necessary. Rapid Floating Caterpillar Drives are available in the same capacity and ratings as Rapid Stationary Caterpillar Drives.



## SPROCKET DRIVES

A Sprocket Drive utilizes a sprocket with an integral shear pin hub which is mounted on the speed reducer output shaft and engages and drives the power chain of an overhead conveyor system. For use in horizontal turns, a sprocket drive requires a 90° chain wrap as the minimum, with 180° chain wraps often used. All components of a sprocket drive are mounted upon a welded steel frame, which, like the caterpillar drive, is installed in the high portion of the overhead conveyor system. The sprocket drive is likewise to pull, not push, the rivetless power chain.

Constant speed drives are the simplest and most economic drives where only one conveyor speed is required. Variable speed drives within the ratio of 3 to 1 are used for applications requiring a speed variation of the overhead conveyor system.



## MULTIPLE DRIVES

Wherever the length of the system, or the loading upon the system, or a combination of these two factors, results in a chain pull greater than the capacity of the chain and drive usually furnished for that size system, multiple drives may be required. Floating caterpillar drives should be used for multiple drive installations to eliminate successive shear pin breakage in the event one drive is overloaded. For recommendations for multilple drive variable speed systems, please contact Rapid Industries' Engineering Department.

## ELECTRICAL CONTROLS

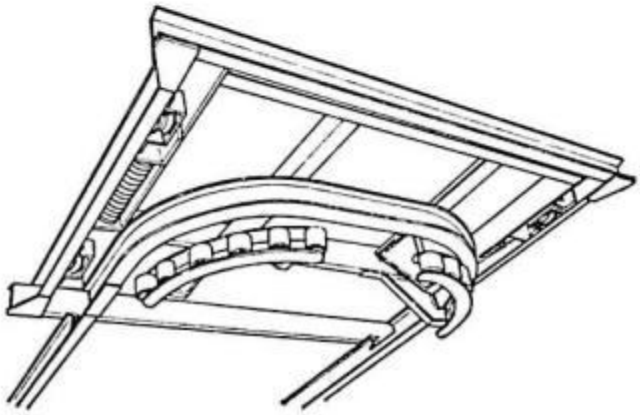
All power and control wiring for the conveyor system is to be installed as per local, state or national electric code. A control panel of a suitable type for the environmental conditions present is to be used to house a fused disconnect or circuit breaker, control transformer, motor starter of proper size with required heaters, relays if needed, and a terminal strip for connection of remote start-stop stations. A non-fused disconnect switch may be installed adjacent to the drive motor, if desired, to isolate the drive for maintenance.

A maintained contact start-stop push button is recommended for multiple push button stations. The maintained push button configuration permits only the station which stops the conveyor to re-start it. Systems requiring the actuation of multiple start buttons on start-stop stations throughout the length of the overhead conveyor are sometimes installed to safeguard personnel who may have moved into the path of a stopped conveyor.

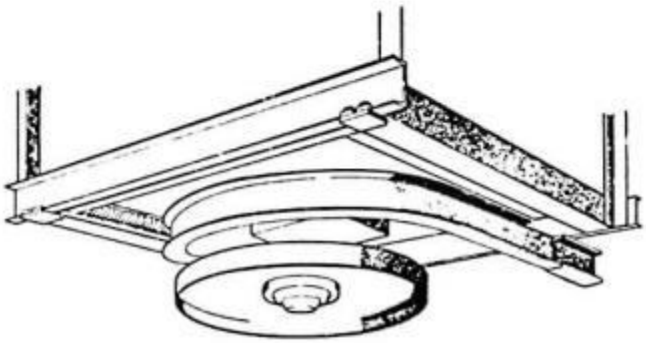
Instantaneous current trip relays may be used in lieu of shear pin hubs for both the caterpillar and sprocket drives. Current trip relays are set for a pre-determined load and will shut down the drive when that load condition is met.

## TAKEUPS

Takeups are required and essential in every overhead conveyor system to control power chain tension and remove chain slack. The takeup is incorporated into roller bank turns or traction wheel assemblies, either 90 degrees or 180 degrees, which then serve a dual function of change of direction for the power chain and a tensioning means for the power chain. Takeups may also be included in spread track loops using two 90 degree traction wheels or roller bank turns with a straight section of track between them up to a 20 feet maximum spread between centerlines. Takeups are actuated by one of several means including all-thread adjustable rods, counterweights, pneumatic or hydraulic cylinders, or are spring actuated the most common application. Takeups are made for all sizes of track in both the Rapid Power Only and Rapid Flow Power & Free overhead conveyor systems. A takeup for a Power & Free system is identical to the takeup used in a Power Only system. Takeups of 8 inches, 16 inches, or 24 inches are avilable to meet the requirements of the overhead conveyor system.



ROLLER BANK SPRING ACTUATED TAKEUP



TRACTION WHEEL SPRING ACTUATED TAKEUP

Custom designed and fabricated takeups for spread track applications in excess of 20 feet in width are available on special order from Rapid Industries, Inc. Consult the Rapid Engineering Department for particulars.

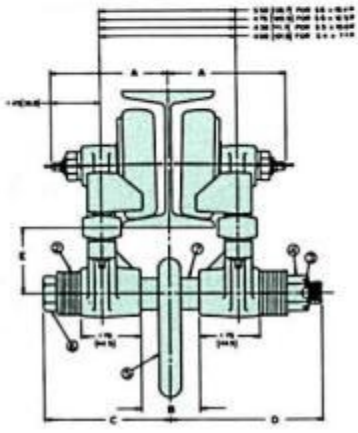
## HAND PUSHED TROLLEY

### One-Ton Capacity Trolley

Rapid hand push trolleys for overhead monorail cranes and hoists are available in load ranges up to 1 ton. These versatile trolleys are adaptable to fit different sized I-beams and utilize Splashproof seals for contaminated environments. Choose the size you need from the table.

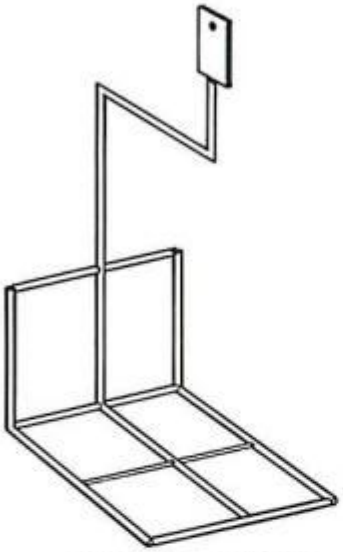
| Rail Size | A | B | C | D | E |
|---|---|---|---|---|---|
| 4" | 3-29/64 | 1-45/64 | 3-3/4 | 4-41/64 | 1-29/32 |
| 5" | 3-41/64 | 2-5/64 | 3-3/4 | 4-41/64 | 1-57/64 |
| 6" | 3-53/64 | 2-15/32 | 3-3/4 | 4-41/64 | 1-7/8 |
| 8" | 4-7/32 | 3-7/32 | 3-3/4 | 4-41/64 | 1-27/32 |

All dimensions are approximate

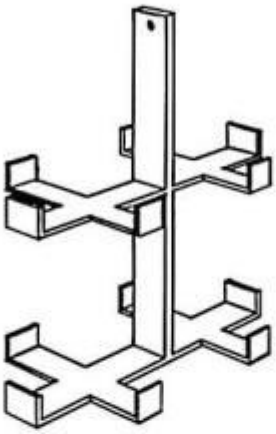


## CARRIERS

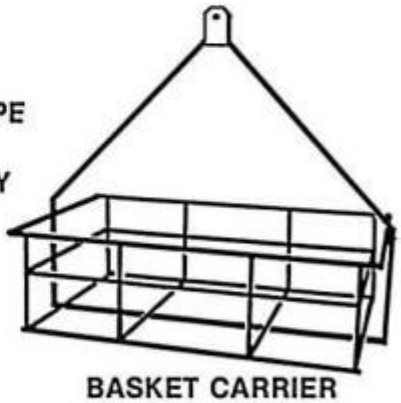
Carriers, permitting either single or multiple loading of products, subassemblies or materials, are available in almost an infinite variety of shapes or configurations. Ease of loading/unloading carriers either manually, "on-the-fly" or by robot is an important consideration in selecting the carrier for your particular application. In robot loading/unloading of overhead conveyors, a PAU (program analog unit) is interfaced with the power chain, often with a Rapid Slave Cat Interface for robot PAU, to transmit to the robot the carrier position data and speed of the power chain. Examples of typical carriers are illustrated below. For assistance in carrier design, contact Rapid Industries' Engineering Department.



**TYPICAL BOX OR TOTE PAN CARRIER - TYPE SUITABLE FOR TRANSFER-ON-THE-FLY**



**MULTIPLE PACKAGE CARRIER**



**BASKET CARRIER**

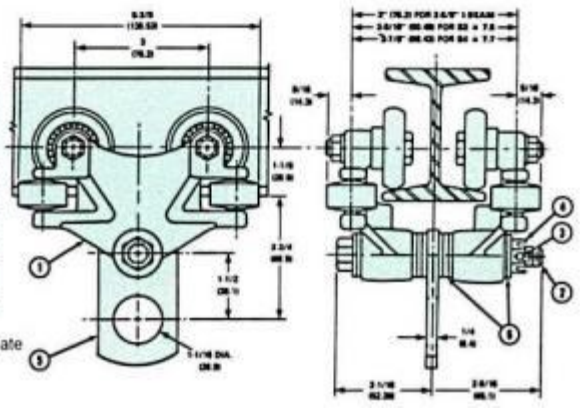
**MULTIPLE PARTS CARRIER**

### 500 Pound Capacity Trolley

For lighter duty applications the 500 pound capacity hand push trolley will run on 2", 3" or 4" I-beams. These trolleys are precision built and run smooth on radii down to 12".

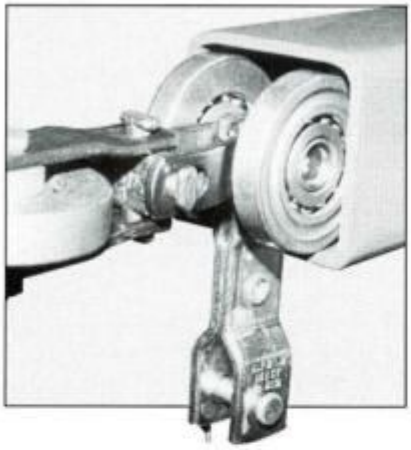
| Hand Pushed Trolley Assembly – #9792 | | |
|---|---|---|
| Assy No | Amt | Description |
| 1 | 2 | Half Trolley Assembly – #9792-1 |
| 2 | 1 | 1/2" Bolt – #8571 |
| 3 | 1 | Cotter Pin 1/8" x 1-1/4" Long |
| 4 | 1 | 1/2" Dia. Finished Hex Slotted Nut |
| 5 | 1 | Load Link – #8147 |
| 6 | 10 | 1/2" S.A.E. Washers |

All dimensions are approximate

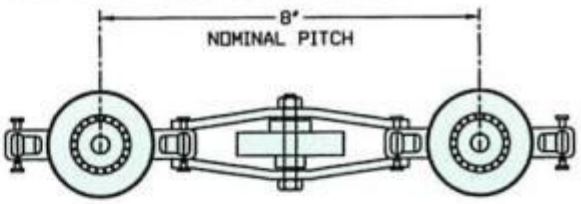


## RAPID FLEX™ ENCLOSED TRACK SYSTEM

The Rapid Enclosed Track Overhead Conveyor is a cost-effective alternative for moving light loads in almost any environment. By using an over/under loop configuration, a 90° twist or a 90° vertical incline, Rapid can meet almost any design requirement without costly customization. Many customers find the ease of installation an extra bonus in purchasing a Rapid Enclosed Track.



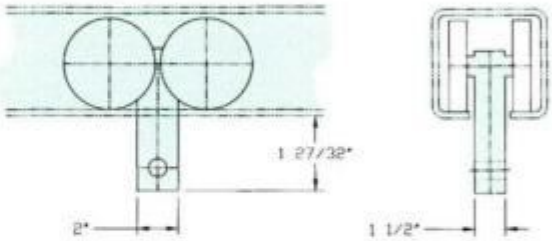
### RAPID FLEX™ CHAIN ASSEMBLY



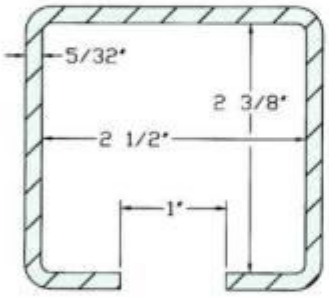

Strength and flexibility are built into all Rapid Chain Assemblies. Chain is shipped in 20 ft. lengths and can be assembled with common hand tools.

**RF-0102 - Heavy Duty (WT. 3.65#/FT.)**

### RAPID FLEX™ 4-WHEEL PUSHER DOG/CHAIN ATTACHMENT




### RAPID FLEX™ TRACK SECTION




Design flexibility, ease of installation, and low maintenance are all features of the Rapid Enclosed Track. Formed with high strength steel, each 20'-0" section can be cut and welded without using any special equipment to fit almost any situation.

**RF-0800 (WT. 5#/FT.) Straight Track Section**

For those heavy loads, Rapid 4-Wheel Pusher Dog/Chain Attachment can be built into the Rapid chain (250 lbs. capacity). With a Rapid Power & Free System, this system has the power and flexibility to handle the most complex operations easily.

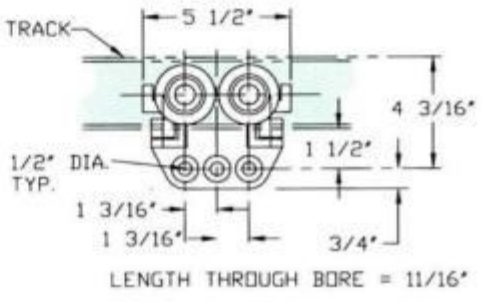
**RF-2100**

## RAPID FLEX™ HAND PUSHED TROLLEY

### 250 POUND CAPACITY TROLLEY

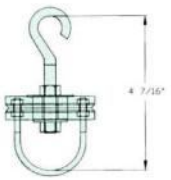
High strength cast body with ball bearing load wheels, provide long trolley life under adverse conditions. Load capacity may be increased up to 1000 lbs. by using additional trolleys connected in tandem with load bars.

**RF-2000**



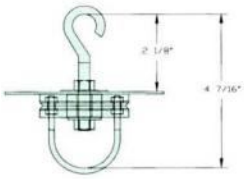
## ACCESSORIES

### RAPID FLEX™ SWIVEL ROTATOR



The swivel rotator can be rotated by hand or automatically with rub rail installed.

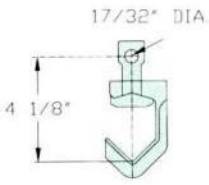
**RF-0204**



Positive rotation can be provided by adding a six point star to the swivel rotator.

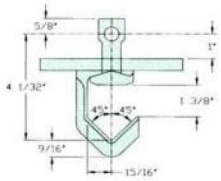
**RF-0205**

### RAPID FLEX™ 90° INDEXING HOOK




Two piece cam construction provides positive 90° indexing.

**RF-0206**



Automatic indexing can be achieved by adding a four point star to the standard hook.

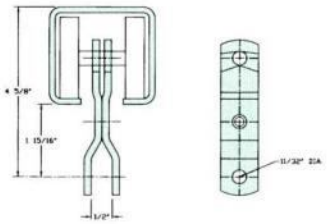
**RF-0207**

## ATTACHMENTS

### RAPID FLEX™ STANDARD "H" ATTACHMENT

75 lbs. capacity

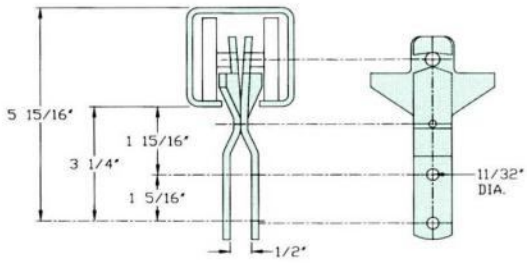
**RF-0201**



### RAPID FLEX™ RIGID "H" ATTACHMENT

75 lbs. capacity

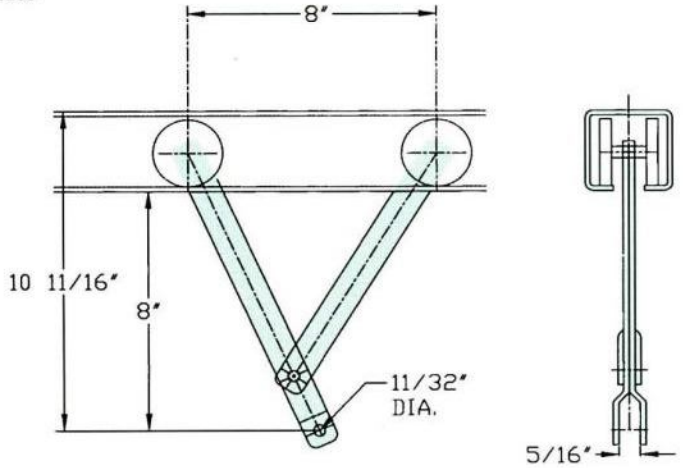
**RF-0202**




### RAPID FLEX™ EXTENDED "H"

75 lbs. capacity with minimum radius of 24"

**RF-0203**

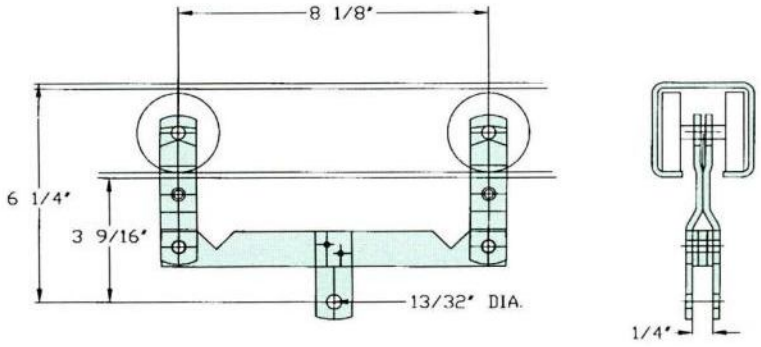



## LOAD BAR ASSEMBLIES

### RAPID FLEX™ LOAD BAR

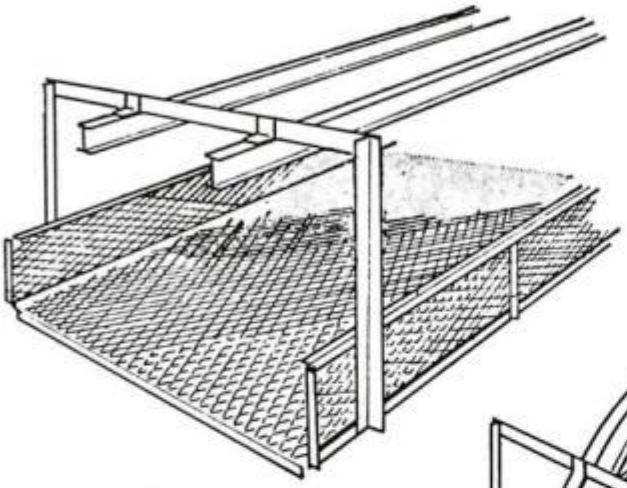
By suspending the load bar from two "H" attachments, the load capacity can be increased.

**RF-0301**

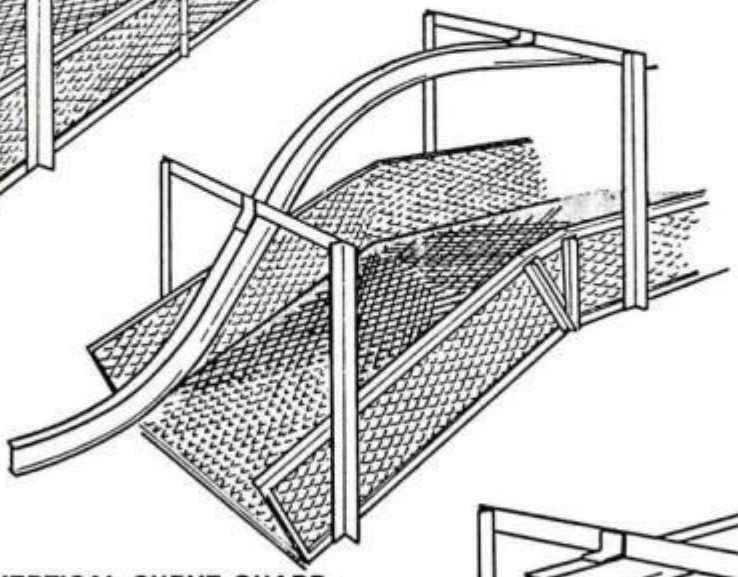


## GUARDS

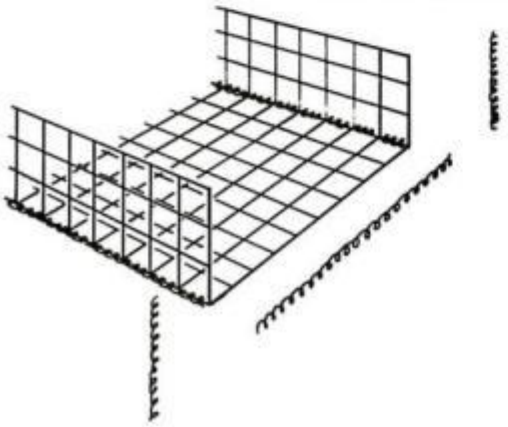
Guards fabricated of expanded metal, wire mesh, or sheet metal are often required to be suspended below the overhead conveyor in areas where there is a potential safety hazard to personnel and to plant equipment in the event something is dislodged from the overhead conveyor carrier. These guards are usually field fabricated on the site and erected as required. In food processing or packing plants the guard is often made of a white fiberglass sheet that is easily removable from the supporting overhead hanger steel for cleaning purposes. Guards are usually always installed over aisles, work areas, and at inclined sections of track at vertical compound curves. Some examples of guards are shown below.



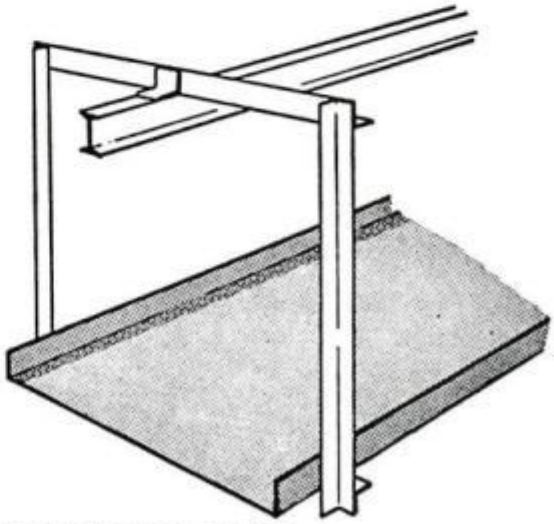
DUAL TRACK GUARD



VERTICAL CURVE GUARD



WIRE MESH GUARD WITH
HELIX WIRE STITCHING



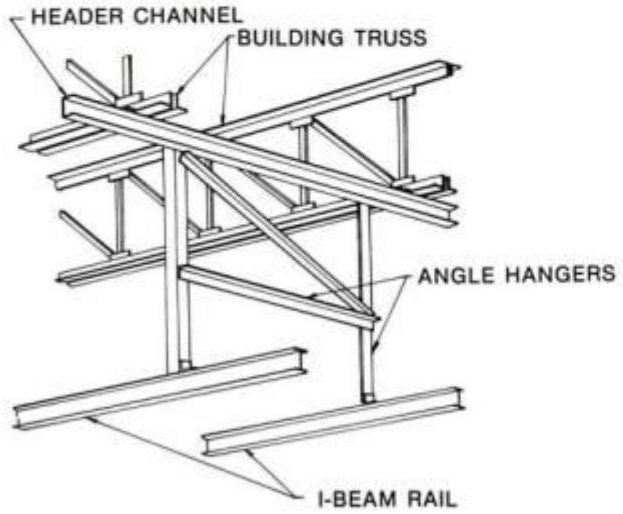
SHEET METAL GUARD

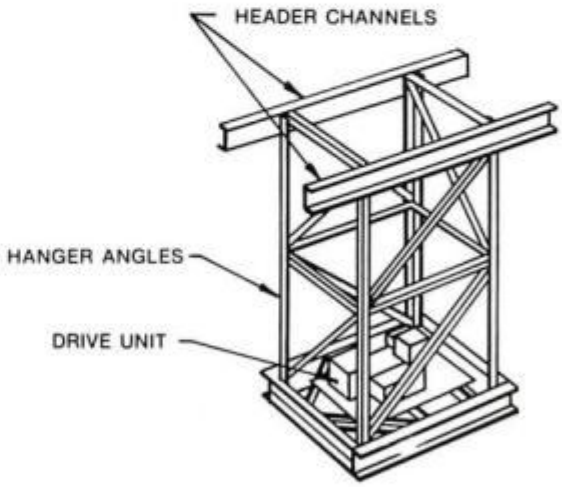
## INSTALLATIONS OF OVERHEAD CONVEYOR SYSTEMS

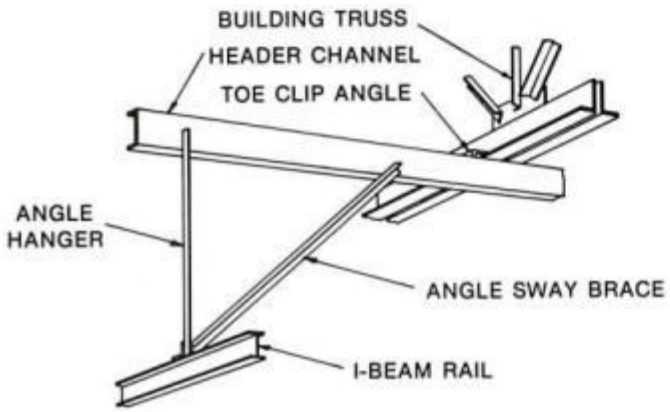
The erection of a Rapid Power Only or Rapid Flow Power & Free Overhead Conveyor system requires that adequately sized structural steel support members be used to hang the track, drive, and all accessories from overhead girders, trusses, or joists, or if this is not permitted (due to the excess loading that would be placed upon building support members) then the Overhead Conveyor system would be floor supported by the erection of properly sized columns and track support steel. The design of this support steel, either overhead or floor supported, has been standardized for most conditions by the industry over the years of erecting and successfully placing into operation overhead conveyor systems. Some examples of this header support steel are shown below. The important factor to remember in installing an overhead conveyor system is that the load carrying capacity of the conveyor is only as strong as the overead header steel or floor support steel from which the conveyor, drive, and accessories are hung.

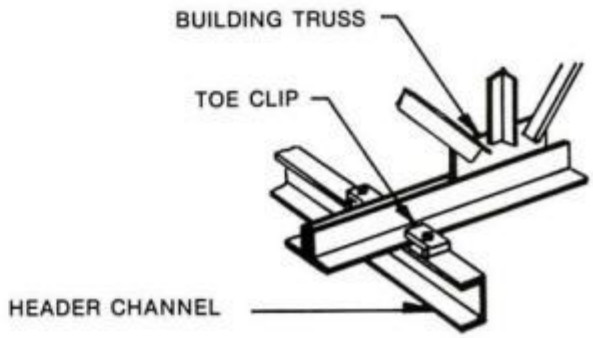
In erecting Power Only and Power & Free systems, it is important that the track be aligned in both the horizontal and vertical planes as nearly straight as possible between points where a change of direction is intended. This reduces friction of the trolleys against the web of the I-Beam track on straight track and thus reduces the power chain pull required of the drive and increases the life of the system.

Power & Free Track must be installed to very close tolerances to permit the proper operation of mechanical, electrical, or pneumatically operated devices such as stops, switches, transfers and loading and unloading operations, especially those done by robots.



## DRIVE LUBRICATION AND MAINTENANCE DATA

| MARK | PART | Lubrication Interval/Hours Operating Conditions | | | Service/Maintenance Instructions |
|---|---|---|---|---|---|
| | | Clean | Moderate | Dirty | |
| A. | Worm Gear Speed Reducer | 1 Yr. | 6 Mos. | 3 Mos. | **Reducer Shipped Without Lubrication**<br>**Initial Operation:** Change oil fill after 2 weeks operation, then six months to one year intervals depending on service conditions.<br>**Temperature:** For temperatures from 0° to 40° F., Dilute oil with very light oil of the same basic crude. The use of kerosene is not recommended.<br>**Grease Fittings:** Grease every 100 hours running time with about 3/8 ball of good bearing grease. |
| B. | Cat-Drive Chain | 300 hrs. | 100 hrs. | 50 hrs. | **Adjustment:** Clearance of 3/16" for 348, 1/8" for 458 and 1/16" for 678 chain should be maintained from face of pusher dog to roll face. Chain tension at midpoint should not exceed 1/4" lateral movement.<br>**Inspection:** Replace or turn over cat-chain when pusher dog becomes excessively worn or burred. |
| C. | Backup Roll (Relubed thru fitting in Bolt) | 500 hrs. | 300 hrs. | 100 hrs. | **Maintenance:** Clean roll bearings with kerosene, blow dry with air and relubricate. Replace rolls when cleaning fails to free rolls.<br>**Inspection:** Replace when surface is excessively gouged or bearing wobbles excessively. |
| D. | Electric Motor | Service & Maintenance Instructions by Manufacturer. | | | |
| E. | V-Belt | NONE | | | Lateral movement of belt on constant speed drives should equal 1 1/2 times thickness for each 24" of sheave centers. |
| | Variable Speed Pullley | Service & Maintenance Instructions by Manufacturer. | | | |
| F. | Take-up Sprocket (Relube thru zerk) | 6 to 12 Mos. | 3 Mos./ 6 Mos. | 4 Weeks/ 3 Mos. | Replace: When sprocket plate thickness wears 1/16", examine tooth contour. Maintain alignment of drive sprockets, take-up sprockets and back-up bar. |
| G. | Drive Sprocket | | NONE | | (SEE TAKE-UP SPROCKET) |
| H. | Corner Drive Sprocket | | NONE | | Examine tooth contour for excessive chain play, wear and gouging. |
| I. | Vee-Grooved Wheels | 6 Mos. to 12 Mos. | 3 Mos./ 6 Mos. | 4 Weeks/ 3 Mos. | **Maintenance:** Relube zerk fittings. |
| | **ROLLER TURN LUBRICATION AND MAINTENANCE DATA** | | | | |
| A. | Roll (Grease Relubed thru Bolt) | 500 hrs. | 300 hrs. | 100 hrs. | **Maintenance:** Clean roll bearings with kerosene, blow dry with air and relubricate. Replace rolls when cleaning fails to free rolls.<br>**Inspection:** Replace when surface is excessively gouged or bearing wobbles excessively. |
| | **TRACTION WHEEL TURN LUBRICATION AND MAINTENANCE DATA** | | | | |
| A. | Traction Wheel with Timken Bearing Hub (Relube thru zerk) | 6 to 12 Mos. | 3 Mos./ 6 Mos. | 4 Weeks/ 3 Mos. | **Inspect:** Wheels for wobbly bearings and excessively worn rims. Clean and relubricate bearings as required for excessive resistance to rotation. |
| B. | Traction Wheel with Graphite Bearing Hub | | NONE | | **Inspect:** Wheels for wobbly bearings and excessively worn rims. |
| C. | Traction Wheel with Dodge # 70 Hub | 6 to 12 Mos. | 3 Mos./ 6 Mos. | 4 Weeks/ 3 Mos. | See Mark A |
| | **CHAIN, TROLLEYS & TRACK LUBRICATION AND MAINTENANCE DATA** | | | | |
| A. | Chain | 500 hrs. | 300 hrs. | 100 hrs. | Lubrication interval varies due to conveyor speed, ambient temperature, type of lubricant, etc. As a rule, chain should be lubricated when dry or after cleaning. Automatic oilers have proven to be useful in many installations. Clean chain periodically with steam or grease solvent and blow dry. Care should be taken when cleaning chain to prevent contamination damage of non-splashproof seal trolleys. |
| B. | Trolleys | Service & Maintenance Instructions by Manufacturer. | | | |
| C. | Track | NONE | | | Should trolleys wear web of track at curves, a graphite grease should be applied to increase life. |

* It is recommended that a lubrication specialist be consulted concerning type and amount of lubricant.

## MAINTENANCE INSTRUCTIONS FOR RAPID OVERHEAD CONVEYORS

1. Upon completion of the erection of an Overhead Conveyor by Rapid Industries and before operation, the customer's maintenance department shall properly lubricate all moving parts. The following charts and suggestions are offered as a guide.

2. Rapid Industries maintains a millwright service to inspect and lubricate Overhead Conveyors on a periodic basis. A quotation to furnish this service will be made upon request.

3. Trolley wheel bearings receive a minimum application of rust-proof spindle oil at the factory protection during shipment only.

4. Trolley wheels operating through steam, elevated temperatures, caustic and abnormal conditions should be baffled for protection and require special lubricated consideration.

5. Trolley wheels operating in elevated temperatures (above 250F) should have an automatic lubricator of positive connection type located a reasonable distance from oven exit to allow parts to cool down to approximately 200F. Lubricators may apply either a mist or fog of light penetrating oil so as to leave a minimum of residue, or fluidized "dry" type molybdenum disulphide lubricant.

6. Inspection is required to locate sluggish wheels or dry chain.

7. Sluggish or frozen wheels must be removed from conveyor and thoroughly cleaned and inspected for later replacement use. The cost of a new trolley may be less than the cost of cleaning the components.

8. To remove welsh plugs, pierce with a sharp tool and pry loose. Replace with new plug which must be pressed in place with a blunt tool.

9. **Do not over lubricate.** Wheels running smoothly require no additional lubricant.

10. Trolley brackets that may become bent in service must be replaced. An attempt to straighten brackets is not often successful due to the metallurgy of the bracket.

11. Chain must be lubricated at drive on slack chain side to insure lubricant reaches bearing point of pin and link.

12. Traction wheels with carbon bushing are **never** lubricated.

13. The floating type drive may be furnished with a chain pull indicator. Above normal (red zone) chain pull indicated a possible lack of lubrication.

14. Check variable speed transmission belt for possible slippage.

15. An adequate supply of spare parts should be on hand for replacement of components when needed. This is especially true for brackets, half trolley assemblies, attachments, and inner caps.

16. I-Beam track and the free track should be inspected a periodic intervals for wear and peening of flanges at vertical curves, and wear on I-Beam webs and channel flanges.

17. It is advisable to permit conveyors operating in cold rooms at low temperatures to be allowed to run at reduced speed continuously overnight to prevent the freezing of lubricants.

18. Lubricants shown in previous chart are recommended.