

ROLCON ENGINEERING COMPANY LIMITED



MANUAL FOR COMMISSIONING, MAINTENANCE & SERVICES FOR CHAINS & SPROCKETS



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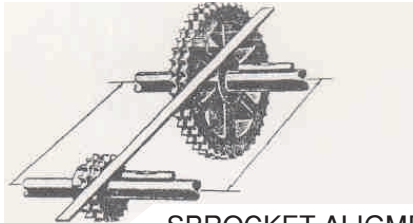


INSTALLATION :

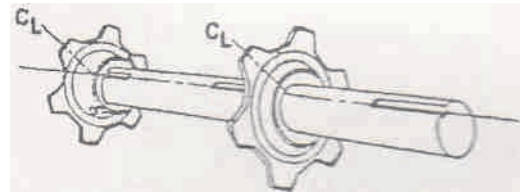
General Requirements

1. Shaft Alignment - Shaft must be rigidly supported in properly designed bearings. Shaft displacement will destroy the initial alignment and shorten chain and sprocket life. Align the shafts horizontally with a leveling device. Head and tail shafts must be parallel and at 90° to the direction of travel of the chain. Take-ups provided as means for shaft alignment and chain tension adjustment.
2. Sprocket alignment-Sprockets must be in a line and not offset on the shafts. Abnormal sprocket and chain sidebar wear will result if alignment is not maintained.

When multi strands of chain must operate as a unit, as in multi strands equipment, the sprocket teeth on the head shaft must be timed to pick up the load on each chain simultaneously, aligning the keyways in the shaft and strand then aligning the keyways of the sprockets, on tooth centerline will assure the proper match. Sprockets should be ordered "keywayed-in-line and matched in pairs". Since the tail shaft is an idling shaft, it is usually keyed to only one sprocket. The other sprocket (s) is held in alignment by set collars and is allowed to turn freely. This permits the sprocket to position itself if uneven wear takes place in the chain strands.



SPROCKET ALIGNMENT



SPROCKETS KEYED IN LINE

3. Chain-Place the chain around the sprockets with the free ends meeting on one sprocket, when assembling straight sidebar chains, insert the connecting link and then the closing bar over the pins. Drive the closing bar onto both pins at the same time taking care not to bend the link. Most chains are designed with a "press-fit" between the pins and bars. do not grind away a pin end so that it fits loosely in the chain sidebar.

If a multiple strand installation where the chains must operate as a unit, be sure the chains are reasonably matched for equal length. Uneven loading may result, if they are not matched. Proper chain tension is essential. A chain that is too tight will cause an overload condition. A chain that is too loose may cause pulsations or interference, which result in abnormal chain and sprocket wear.

4. Freedom from interference-contact between the moving parts of the equipment and adjacent objects must not occur. Clearance should be provided to allow for normal chain sag and take-up movement. Guides and tracks should be smooth and free of foreign objects. Exit and entry points of guides and tracks must permit the chain to pass with a minimum amount of impact or interference.

lubricants such as oil and grease should always be applied between the inner and outer linkplates on the side facing the chain wheel. A periodic cleaning of the chain to remove abrasive elements, dirt and sticky materials will prolong the working life. In addition to the lubricants mentioned, dry lubricants may be employed for particular applications. These are generally sprinkled, sprayed or brushed on before chain assembly.

(2) Assembly of Link Chains :

Link chains are generally joined by fastening links. Wherever possible, chains with an even number of links should be used, so that the chains begin and end with an inner link to be joined by a no. 10 straight connecting link. An uneven number of links will necessitate the use of a cranked link, which will adversely affect the breaking strength of the chain and decrease it by about 20%. When cutting continuous chain into specific lengths attention is to be paid that the outer link taken off must not be re-used. Chain wheels must be in perfect alignment and should be fitted as close as possible to the point of support. Care should also be taken that the shafts are parallel. As to the positioning of shafts an inclination of 60 degree to the horizontal is recommended. Vertically arranged centre drives necessitate constant tension adjustment to prevent the chain - from disengaging from the lower wheel. Chain sag must not exceed 2% of the centre distance, and should be as little as possible on impulsive drives. Chain sag can be adjusted either by alteration of shaft centres, by retightening the tension station, or by adjusting the jockey or tension rail. Overtightening of the chain should be avoided, since in addition to impeding an extra load on the bearings, this will lead to quick wear and noisy running. The tightener should have a tension-adjusting movement of at least 1.5 times the pitch to allow -for removal of a 2-pitch assembly.

(3) Chain Wheels :

Chain life depends in part, of course, on the correct construction and tothing of the wheel. In general, the number of



teeth on driving Wheel is atleast 19. Jockeys and pinions used in secondary duty jobs may have a minimum of 13 teeth. For high-speed and impulsive drives it is recommended that the teeth be heat treated to increase wear resistance. Chain lap on the Wheels should not be less than 20 degree, and the transmission ratio of 1:8 should not be exceeded. The number of teeth on the wheels and the number of links in the chain should be correlated in such a way that the same roller will not, after each revolution, engage in the same tooth gap. In extreme cases, conveyor chains with large pitches and running at relatively low speeds will operate over Wheels with a minimum of 6 teeth.

Start-up

1. Adjust chain tension. On high temperature applications chain must be adjusted while cold.
2. Check equipment and surrounding area for tools, loose parts, etc., which might obstruct conveyor operation or create a safety hazard.
3. Jog equipment thru one complete cycle.
4. Start equipment and run with no load make certain that all chain Joints flex freely.
5. If the application permits the use of oil, lubricate each chain Joint well with a good grade of non detergent petroleum base oil. The oil should be applied between the sidebars at each Joint and be of a viscosity such that it will flow freely into the pin-bushing area. Grease may be used if it can be applied (forced) directly to the pin-bushing area. However, heavy grease applied to the outside will not flow into the Joint and may even act as a barrier to subsequent lubrication or trap contained materials inside the Joint.
A break-in running period of 8 to 12 hours, under no load, will normally allow the chain Joints to seat properly. It is normal for the chain to elongate slightly during this period. A final adjustment of the take-ups may be required.

OPERATION

Loading

Loading any equipment should be accomplished as gently as possible to reduce impact. The load should, if possible, be placed or slid onto the equipment to reduce surging caused by rough and irregular loading.

Unload a equipment before shutting it down. Starting a loaded equipment places extra strain on all the equipment.

A equipment should be run occasionally during extended shut down periods to keep the working parts of the system free from corrosion and in operating condition. Overloads and shortened life will result, if the system is allowed to bind up from corrosion.

MAINTENANCE

A chain like any other operating equipment, requires good maintenance to obtain long life and satisfactory performance. In the following paragraphs, it is assumed that : (1) the components of the system have been properly selected for the application; (2) the shafts, sprockets and equipment have been installed correctly; and (3) adequate lubrication has been provided.

Inspection Schedule

The major requirement is to establish a practical schedule and to follow it faithfully. Experience will indicate any need for changes in the Schedule. As with all new equipment, some readjustment may be required during the initial "break-in" period. Therefore, the initial schedule should provide for frequent inspections. After the system has been run-in, the time between inspections may be extended. Such changes should be made gradually as experience dictates.

INSPECTION ITEMS :

1. Lubrication - it has been shown that a separating wedge of fluid lubricant is formed in operating chain Joints much like that formed. Therefore, fluid lubrication must be applied to assure an ample oil supply to minimize metal to metal contact.

Manual - Make sure the lubrication schedule is being followed, and that the oil is being properly applied.

Drip - Inspect the filling of oiler cups and the rate of feed. Check that the feed pipes are not closed and are properly positioned over the chain.

Bath - Inspect the oil level and check that there is no sludge. Drain, flush and refill the system as the application requires.

If the chains have not been lubricated properly, the joints may have a brownish (rusty) color and the pins of the connecting link of the chain, when removed, may be discolored (light or dark brown). Also, the pins may be roughened, grooved or galled.

Properly lubricated chains will not show the brownish colour at the joints but will be brightly polished with a very high luster.

2. Wear on link plates and sides of sprocket teeth-such wear indicates misalignment.



Shaft and sprocket alignment-check shaft and sprocket alignment directly.

This check may reveal misalignment before wear on chains and sprocket becomes apparent.

4. Wear on working faces of sprocket teeth-check for wear on the working faces of the sprocket teeth. As the system runs in, these faces should develop a bright polished appearance. Scratches, galls, grooves or visible change in tooth form are signs of trouble, probably caused by lubrication failure or overloading.
5. Chain tension should be checked and adjusted. Chain elongation-an elongation of as much as three percent indicates that the chain is riding near its limit of allowable height on the sprocket teeth.
A gradual increase in chain length is the result of normal wear, A sudden increase in stack indicates one or more of the following :
 - a. Lubrication failure;
 - b. Excessive overloading or shock;
 - c. Displacement of shaft bearings;
 - d. Displacement or failure of take-ups.
6. Inspect the chain periodically to be sure it is free from dirt, grit or other abrasive material. Clean out extraneous material from the chain, especially the kind that sets up or hardens. Even under the best operating conditions periodic cleaning of the chain is good economy. Gummed lubricant and the products of normal wear can cause rapid pin and bushing wear.
7. Guides, tracks and the area below the equipment should be inspected frequently for build up of material or dirt which will cause interference or binding of the chains. Exit and entry points of guides and tracks must permit the chain to pass with a minimum amount of impact or interference. If lubricated, check for proper lubrication. Roller chain tracks can be over-lubricated reducing the friction to the point where the rollers will slide rather than roll.
8. Exceptionally low chain speed coupled with high drag friction will occasionally cause surging. A slight increase in speed will correct this problem, if the friction cannot be reduced.

Additional Procedures :

New link in an old chain-Never insert a new link in a chain that has been appreciably elongated by wear. The pitch of the new link will be shorter than that of the other links, and the resulting shock, each time the link engages the sprocket, will reduce the life of the chain.

New chain on worn sprockets-Do not install a new chain on badly worn sprockets. A few hours operation under such condition can do more damage to the chain than months of normal use.

Storage of idle Chains and Sprockets

Unless properly protected, the components of equipment system deteriorate during long periods of idleness. If a chain is to be stored, remove it from the sprocket, clean and reoil it and cover it with heavy grease. Store the chain where it will be protected from moisture and mechanical injury.

The sprockets may be left in place on the shafts. Cover each with heavy grease and protect them -from mechanical injury. Before placing the equipment in service again, thoroughly clean the chain and sprockets or remove the protective grease; then relubricate the chain.

Draw chain ends together and attach with connecting pin. Adjust take-ups to properly tension chain on equipment.

USEFUL FACTS ABOUT LINK CHAINS

1) Lubrication of Link Chains :

After assembly and inspection every chain is pre-lubricated with a preservative, by immersion in a bath of hot oil, which penetrates to the working surfaces. However, once the chain is in operation the method of lubrication should be adapted to the chain speed. Mineral oil SAE-40 to 60 and the following methods of lubrication are recommended for link chains

V [M/S]	Method of lubrication	
III	4	by hand-either by means of a brush or from spout oil can
II	12	drip lubrication - permanently - by drip oiler
I	16	oil bath or splash lubrication - by slinger disc
II	40	forced lubrication by circulating pump - preferably with autocool