



Modes of Chain Failure

Modes of Chain Failure (See Illustrations on the right for details)

1. **Normal Wear** - Chain Elongation. This is the result of wear when the load chain articulates over the chain rollers. See illustration No. 1 for explanation of wear limits. When a theoretical length of 12-in. (305 mm) new chain has elongated from wear to a length of 12.360-in. (314 mm) [3%], it has exceeded the allowable wear limit. The wear should be measured in the area that passes over the roller most often. If the length in the articulating section exceeds allowable wear limits (see text), replace entire length of both chains.
2. **Chain Stretch**. This can be caused by a combination of chain wear and overload. This (overload) can show up as elongation of plates which do not pass over the rollers. If there is any significant (1%) elongation in the area which does not pass over the rollers, replace the entire length of both chains. Cracked chain plates (illustration no. 3) and enlarged holes (illustration no. 7) can also result from chain stretch. The entire length of both chains must be replaced if either of these conditions are found.
3. **Plate / Pin Rotation and / or Plate / Pin Lateral Movement**. This is generally caused by the plate seizing the pin at articulation which indicates lack of lubrication where the joint rotates over the roller. (See illustration No. 2.) This can result in pin breakage in extreme cases. If any evidence of pin rotation is noted, replace entire length of both chains.
4. **Plate / Pin Cracks**. Cracks result from fatigue, stress corrosion, corrosion fatigue. (See illustrations No. 3, 4, and 5.) If any cracks are observed of any kind on any link, replace entire length of chain.
5. **Chain Joint Stiffness**. (See illustration No. 6.) Lack of lubrication. Check the chain for other modes of failure. If none are observed, lubricate thoroughly and place back in service. If stiffness remains, the chain may have been damaged and require replacement.
6. **Edge Wear of Plates**. (See illustration No. 8.) Edge wear can occur at extended hours of service and if sliding of chain occurs because of chain roller bearing problems. If wear exceeds 5% of plate height of unused plate, replace entire length of chain.
7. **Worn Outside Links or Pin Heads**. (See illustration No. 9.) Check for misalignment of the chain roller. Replace the chain if wear is significant. Check (see Check Procedure) the chain for all modes of failure. If none are found, eliminate the misalignment and place back into service.

WARNING: Death or serious injury can occur from improper maintenance practices. Always follow the guidelines below.

I. Use proper safety precautions.

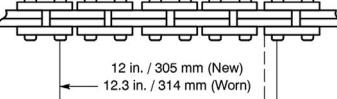
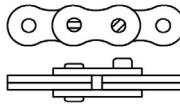
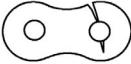
- a. Always lower the mast and carriage to its lowest position before inspecting the leaf chain, unless the mast and carriage are securely blocked.
- b. Always use OSHA approved support means (man lift, scaffolding, ladder, or platform) when inspecting, removing, or servicing lift chains. Always turn off the engine. Do not allow anyone to touch the controls while people are near the upright.

II. Use Lockout / Tagout Procedure to reduce causes of possible injury.

III. Use only assembled chain. Do not build lengths from individual components.

IV. Do not attempt to rework damaged chains by replacing only the components obviously faulty. The entire chain may be compromised and should be discarded.

V. Do not weld any chain or component. Welding spatter should never be allowed to come in contact with chain or components.

Appearance and/or Symptom	Probable Cause	Correction
1. Excessive Length (elongation) Measure section of chain that runs over sheaves. 3% wear elongation is maximum. 	Normal Wear Permanent deformation (stretch) from overload	Replace chain immediately and eliminate the source of overloads
2. Abnormal Protrusion or Turned Pins 	Excessive friction from high loading and inadequate lubrication	Replace chain and lubricate more frequently
3. Cracked Plates (Fatigue) 	Loading beyond chain's capacity (dropping load and catching it)	Replace chain and eliminate dynamic (impulse) overloading
4. Arc-like Cracked Plates (Stress Corrosion) 	Severe rusting or exposure to acidic or caustic medium, plus static stress at press fit between pin and plate. (No cyclic stress necessary)	Replace chain and protect from hostile environment by lubricating more frequently
5. Cracked Plates (Corrosion Fatigue) Perpendicular to Pitch Line, plus rust or other evidence of chemical corrosion 	Corrosive environment and cyclic motion (chain under cyclic operation)	Replace chain and protect from hostile environment by lubricating more frequently
6. Tight Joints 	Dirt or foreign substance packed in joints Corrosion and rust Bent pins	Clean and relube Replace chain Replace chain
7. Enlarged Holes 	High overload, dropping and catching load	Replace chain and correct cause of overload
8. Worn Contour (Edge Wear) 	Normal wear on sheave bearing area Abnormal wear, rubbing on roller	Replace chain when wear reaches 5% of H Replace chain and correct cause of overload Check chain roller bearing
9. Worn Surfaces on Outside Links or Pin Heads 	Misalignment, rubbing on roller flanges	Check alignment of anchors, chain rollers and chain roller pin

If any of the above conditions exist, contact your Taylor representative for guidance on ordering the correct chain for your Taylor lift truck.

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