

Chain drive wikipedia

Roller chain or bush roller chain is the type of chain drive most commonly used for transmission of mechanical power on many kinds of domestic, industrial and agricultural machinery, including conveyors, wire- and tube-drawing machines, printing presses, cars, motorcycles, and bicycles. It consists of a series of short cylindrical rollers held together by side links. It is driven by a toothed wheel called a sprocket. It is a simple, reliable, and efficient means of power transmission.

Sketches by Leonardo da Vinci in the 16th century show a chain with a roller bearing. In 1800, James Fussell patented a roller chain on development of his balance lock; and in 1880 Hans Renold patented a bush roller chain;

There are two types of links alternating in the bush roller chain. The first type is inner links, having two inner plates held together by two sleeves or bushings upon which rotate two rollers. Inner links alternate with the second type, the outer links, consisting of two outer plates held together by pins passing through the bushings of the inner links. The "bushingless" roller chain is similar in operation though not in construction; instead of separate bushings or sleeves holding the inner plates together, the plate has a tube stamped into it protruding from the hole which serves the same purpose. This has the advantage of removing one step in assembly of the chain.

There are also many chains that have to operate in dirty conditions, and for size or operational reasons cannot be sealed. Examples include chains on farm equipment, bicycles, and chain saws. These chains will necessarily have relatively high rates of wear.

Many oil-based lubricants attract dirt and other particles, eventually forming an abrasive paste that will compound wear on chains. This problem can be reduced by use of a "dry" PTFE spray, which forms a solid film after application and repels both particles and moisture;

Chains operating at high speeds comparable to those on motorcycles should be used in conjunction with an oil bath. For modern motorcycles this is not possible, and most motorcycle chains run unprotected. Thus, motorcycle chains tend to wear very quickly relative to other applications. They are subject to extreme forces and are exposed to rain, dirt, sand and road salt.

Motorcycle chains are part of the drive train to transmit the motor power to the back wheel. Properly lubricated chains can reach an efficiency of 98% or greater in the transmission. Unlubricated chains will significantly decrease performance and increase chain and sprocket wear;

Two types of aftermarket lubricants are available for motorcycle chains: spray on lubricants and oil drip feed systems.

If the chain is not being used for a high wear application (for instance if it is just transmitting motion from a hand-operated lever to a control shaft on a machine, or a sliding door on an oven), then one of the simpler types of chain may still be used. Conversely, where extra strength but the smooth drive of a smaller pitch is required, the chain may be "siamesed"; instead of just two rows of plates on the outer sides of the chain, there may be three ("duplex"), four ("triplex"), or more rows of plates running parallel, with bushings and rollers between each adjacent pair, and the same number of rows of teeth running in parallel on the sprockets to match. Timing chains on automotive engines, for example, typically have multiple rows of plates called strands.

Roller chain is made in several sizes, the most common American National Standards Institute (ANSI) standards being 40, 50, 60, and 80. The first digits indicate the pitch of the chain in eighths of an inch, with the last digit being 0 for standard chain, 1 for lightweight chain, and 5 for bushed chain with no rollers. Thus, a chain with half-inch pitch is a No. 40 while a No. 160 sprocket has teeth spaced 2¹⁶⁰inches apart, etc. Metric pitches are expressed in sixteenths of an inch; thus a metric No. 8 chain (08B-1) is equivalent to an ANSI No. 40. Most roller chain is made from plain carbon or alloy steel, but stainless steel is used in food processing machinery or other places where lubrication is a problem, and nylon or brass are occasionally seen for the same reason.

Roller chain is ordinarily hooked up using a master link (also known as a "connecting link"), which typically has one pin held by a horseshoe clip rather than friction fit, allowing it to be inserted or removed with simple tools. Chain with a removable link or pin is also known as "cottered chain", which allows the length of the chain to be adjusted. Half links (also known as "offsets") are available and are used to increase the length of the chain by a single roller. Riveted roller chain has the master link (also known as a "connecting link") "riveted" or mashed on the ends. These pins are made to be durable and are not removable.

A horseshoe clip is the U-shaped spring steel fitting that holds the side-plate of the joining (or "master") link formerly essential to complete the loop of a roller chain. The clip method is losing popularity as more and more chains are manufactured as endless loops not intended for maintenance. Modern motorcycles are often fitted with an endless chain but in the increasingly rare circumstances of the chain wearing out and needing to be replaced, a length of chain and a joining link (with horseshoe clip) will be provided as a spare. Changes in motorcycle suspension are tending to make this use less prevalent.

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