

Classification of Chains Based on Strength and Reliability in Machines

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ABSTRACT

A chain is a consistent machine element used for transmission of power. It has features like large reduction ratio, high flexibility, low bending stiffness, relatively cheap, high axial stiffness, high efficiency and can be used for multi-axis shaft transmission.

Keywords: chain, ratio, power, transmission, cheap

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INTRODUCTION

A chain is a reliable machine component, which transmits power by means of tensile forces, and is used primarily for power transmission and conveyance systems. The function and uses of chain are similar to a belt.

There are many kinds of chain. It is convenient to sort types of chain by either material of composition or method of construction.^[1-7]

We can sort chains into five types:

- Cast iron chain
- Cast steel chain
- Forged chain
- Steel chain
- Plastic chain

Demand for the first three chain types is now decreasing; they are only used in some special situations. For example, cast iron chain is part of water-treatment equipment; forged chain is used in overhead conveyors for automobile factories.

It is important to note that, roller chain is a chain that has an inner plate, outer plate, pin, bushing, and roller.^[8-17]

CLASSIFICATION OF CHAINS Based on the Type of Application

We can sort chains according to their uses, they can be broadly divided into six types:

- (1) Power transmission chain
- (2) Small pitch conveyor chain
- (3) Precision conveyor chain
- (4) Top chain
- (5) Free flow chain
- (6) Large pitch conveyor chain

The first one is used for power transmission; the other five are used for conveyance. In the Applications section of this book, we will describe the uses and features of each chain type by following the above classification.

In the following section, we will explain the composition of power transmission chain, small pitch chain, and large pitch conveyor chain.

Because there are special features in the composition of precision conveyor chain, top chain, and free flow chain, checks the

appropriate pages in the Applications section about these features.

Basic Structure of Power Transmission Chain

A typical configuration for RS60-type chain is shown in Figure 1.

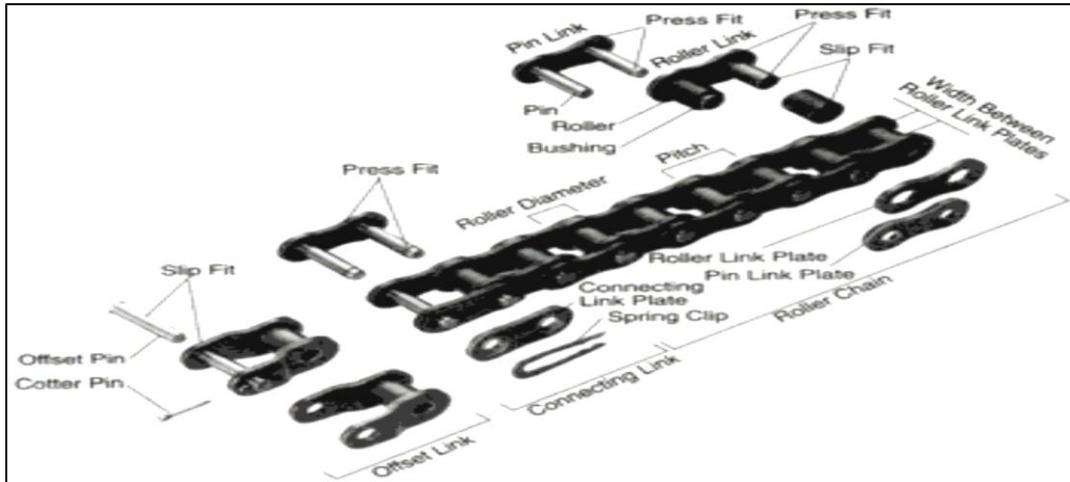


Fig. 1. The basic components of transmission chain.

Connecting Link

This is the ordinary type of connecting link. The pin and link plate are slip fit in the connecting link for ease of assembly. This type of connecting link is 20% lower in fatigue strength than the chain itself. There are also some special connecting links which have the same strength as the chain itself (see Figure 2).^[18-23]

Offset Link

An offset link is used when an odd number of chain links is required. It is 35% lower in fatigue strength than the chain itself. The pin and two plates are slip fit. There is also a two-pitch offset link available that has fatigue strength as great as the chain itself (see Figure 3).

Tap Fit Connecting Link

In this link, the pin and the tap fit connecting link plate are press fit. It has fatigue strength almost equal to that of the chain itself (see Figure 2).

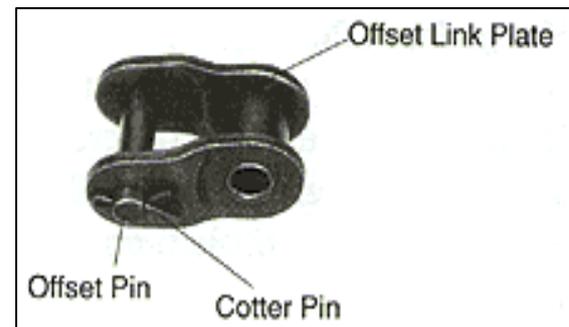


Fig. 3. Offset link.

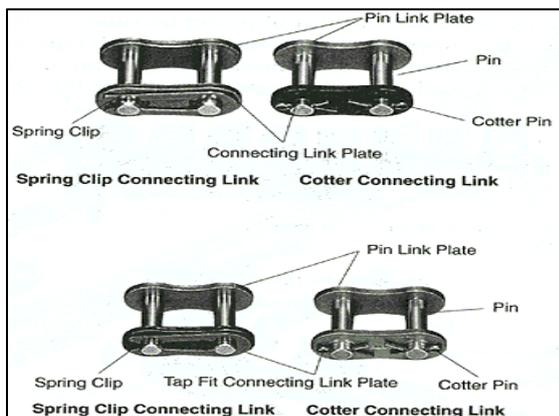


Fig. 2. Standard connecting link.

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