

## Module 2 - Fundamental facts

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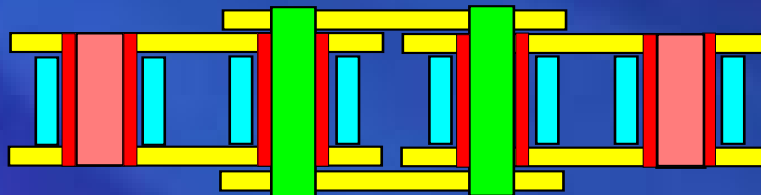
Roller / Drive / Transmission chain

# How it all started

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Hans Renold was a Swiss engineer who came to England in 1873.  
In 1880 he invented & patented  
the bush roller chain.

Previously chain was only made up of pins and plates and all the load was carried between the pin and the plates (the intersection between the green and yellow inner plates in the diagram). The introduction of the bush (red) ensures the load was carried all along the red area giving a much longer chain life. Long chain life remains key objective of quality chain manufacturers.



Bush Roller Chain

# Today's Chain

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Today's Renold chain has features which give high wear and fatigue resistance.

This means demanding applications can be tackled with ease.



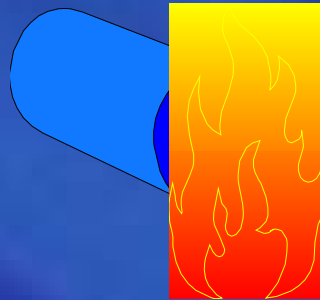
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# Modern Manufacturing

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Development and refinement of manufacturing processes such as surface finishing and heat treatment along with the use of high quality steel has brought further substantial improvements to chain life.

New designs are still being introduced to improve the wear life of Renold Chain.



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# Transmission Chain Components

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A break-down of chain showing the 5 key components



# Journal Bearings

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Chain is a series of journal bearings joined together, by side plates

This bearing is where the chain wear occurs and where lubrication is needed



# Rollers

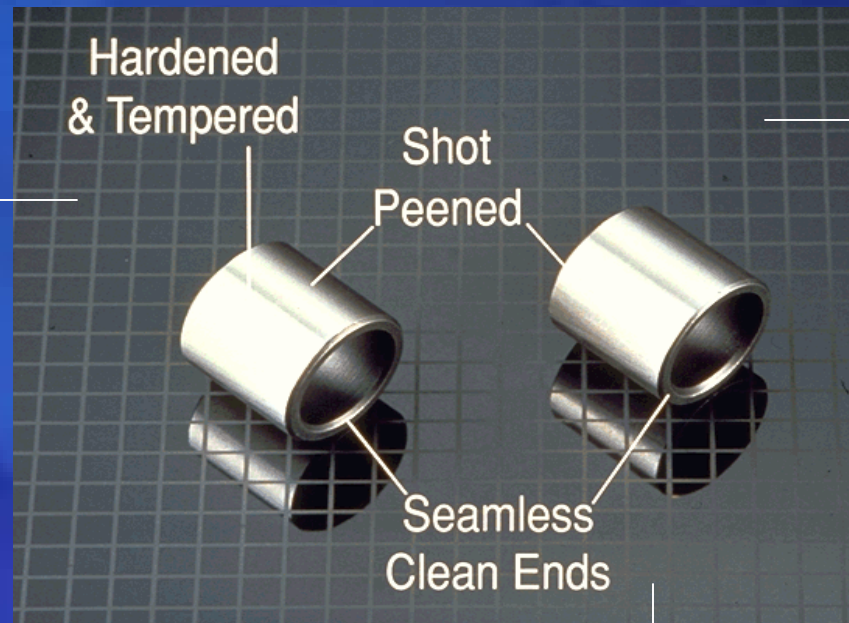
Hans Renold gave a number to each component

Rollers were No.1. Rollers can either be curled (i.e made from sheet curled round) or be solid (made from bar and extruded). Solid rollers give improved resistance to shock loading and fatigue. Curled rollers are normally more concentric but are sometimes forced to open under heavy load.

Signs- Normally heat treated to improve resistance to shock loading.

- Sometimes shot peened to improve resistance to crack propagation.

Special heat treatment  
to improve resistance  
to shock load



Sophisticated  
surface  
treatment to  
improve  
fatigue  
resistance

Seamless to ensure no weak load bearing  
area and excellent concentricity.

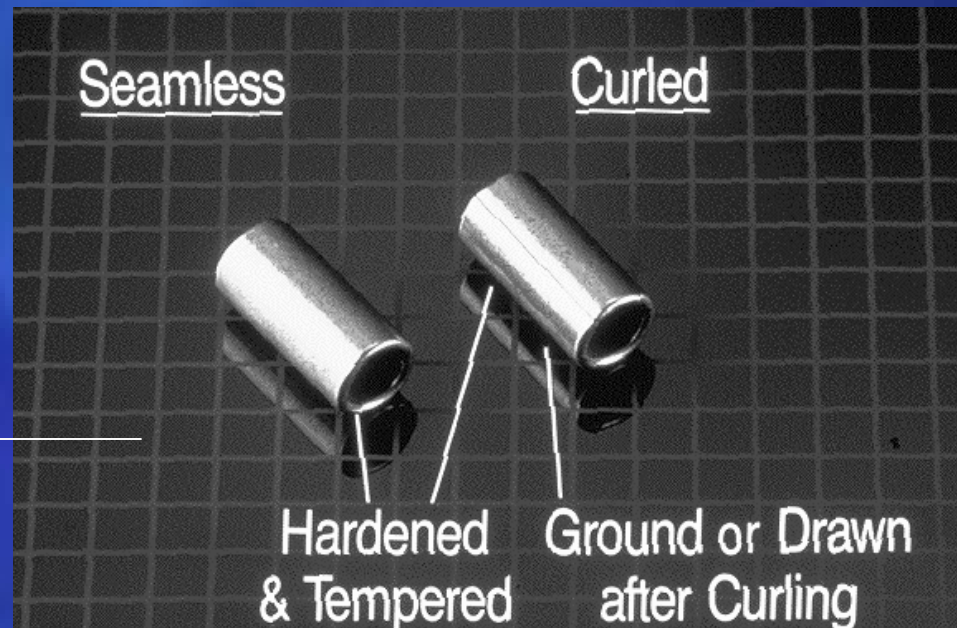
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# Bushes

Bushes were No.2

Bushes as with rollers can be either curled or solid with the same benefits and drawbacks as a roller.

Signs- Normally heat treated to improve wear.  
Sometimes coned to make bore parallel when pushed with an interference fit into the inner plates.



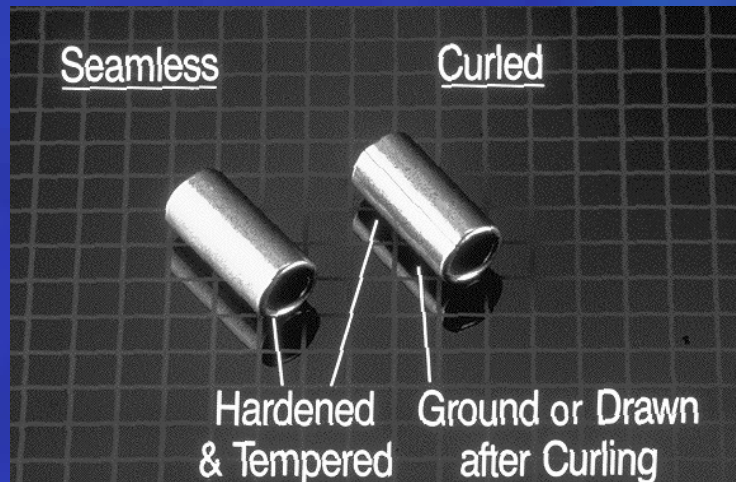
Special heat treatment to prolong wear. ←

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# Bush chain - no roller

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In some instances chain is produced without a roller. This is common in applications where there is a possibility of the roller and bush seizing up with debris.

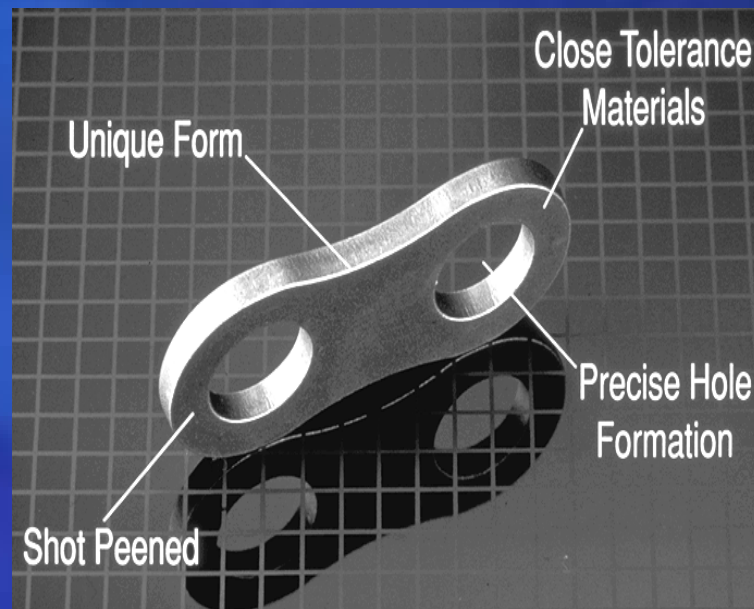
Applications where this can happen include water treatment where the use of a roller to protect the bush is not always necessary.

# Inner Plate

The Inner plate was No.3

Plates are normally waisted. The thicker the waist normally the better the load bearing characteristics. Renold plates have a unique shape and precise holes to give extra long life.

- Signs- normally heat treated to improve performance
- sometimes shot peened to improve fatigue resistance
- Hole quality is important for longer life.

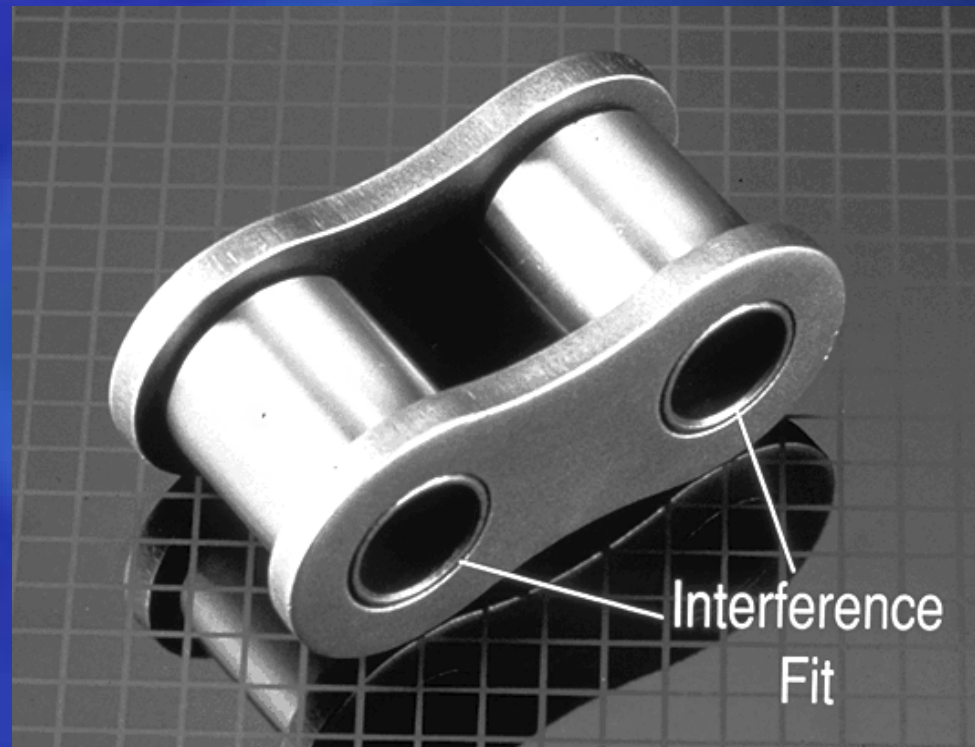


Special surface treatment

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# Inner Link

When the first three components are assembled, this becomes the inner link, hence a Number 4



Link No.4

# Pins

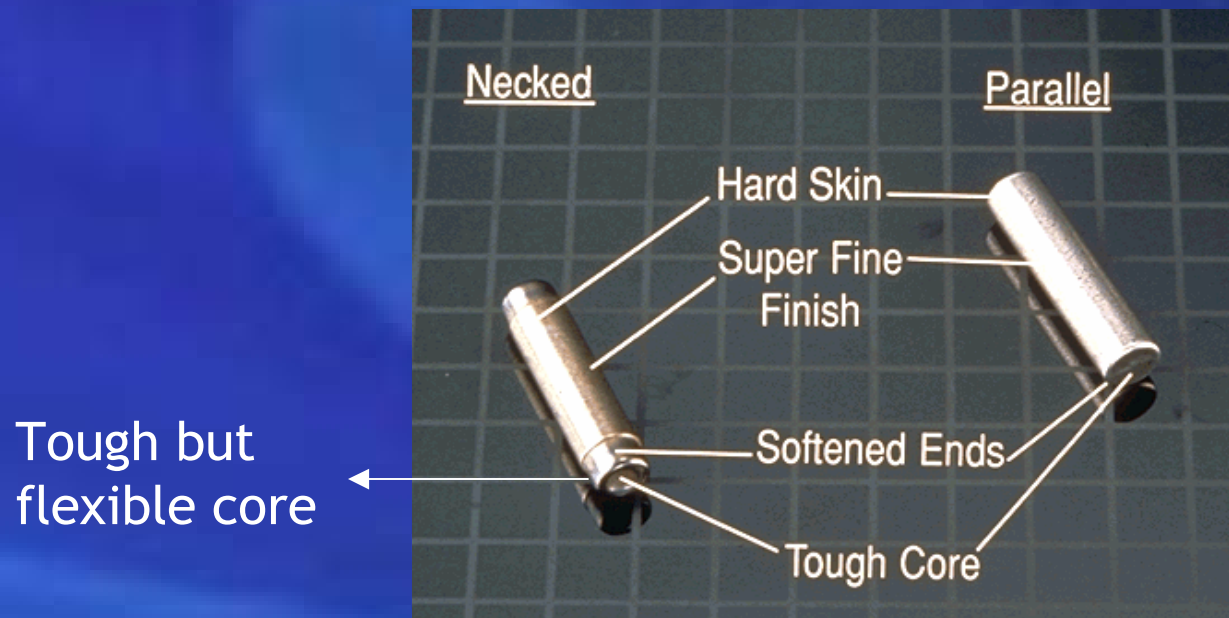
Bearing Pins came next - No.5

Pins are normally ground to give a smooth surface for improved wear.

Signs- “through hardened” for resistance to heavy loading or “case hardened” for a hard surface finish but a softer more flexible core.

Normally riveted after fixing through the outer plate

Renold chains have softened ends to make disassembly of the chain easy.



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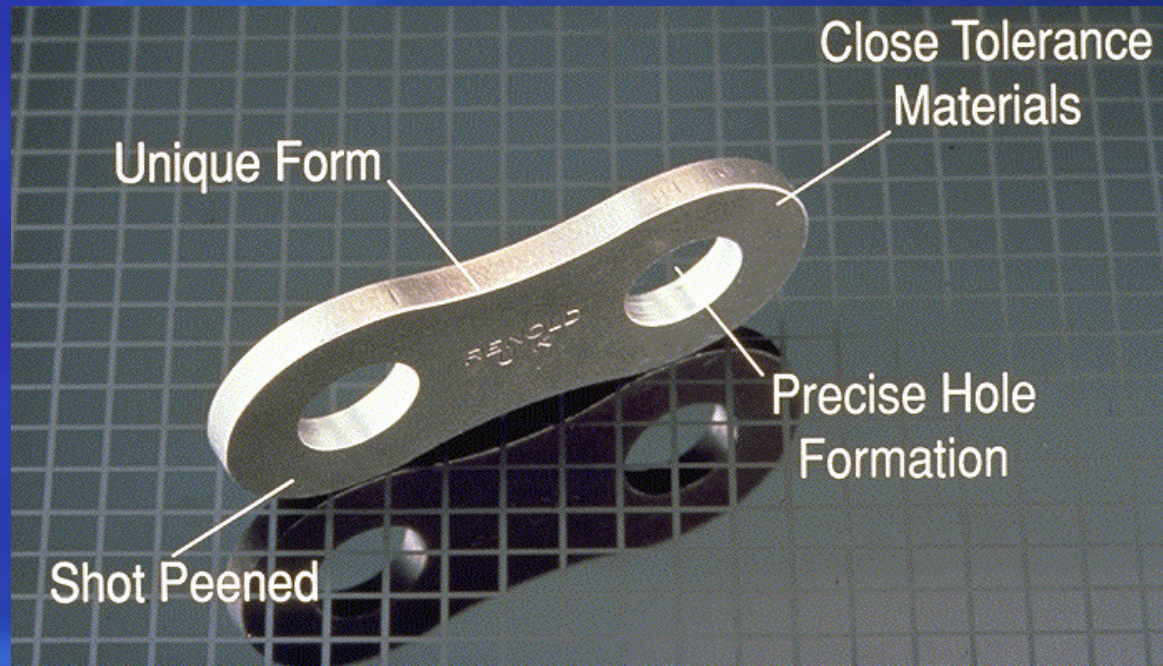
# Outer Plate

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## The outer plates No.6

Similar in construction and heat treatments to inner plates.

- Signs- normally heat treated to improve performance
- sometimes shot peened to improve fatigue resistance
- Hole quality is important for longer life.

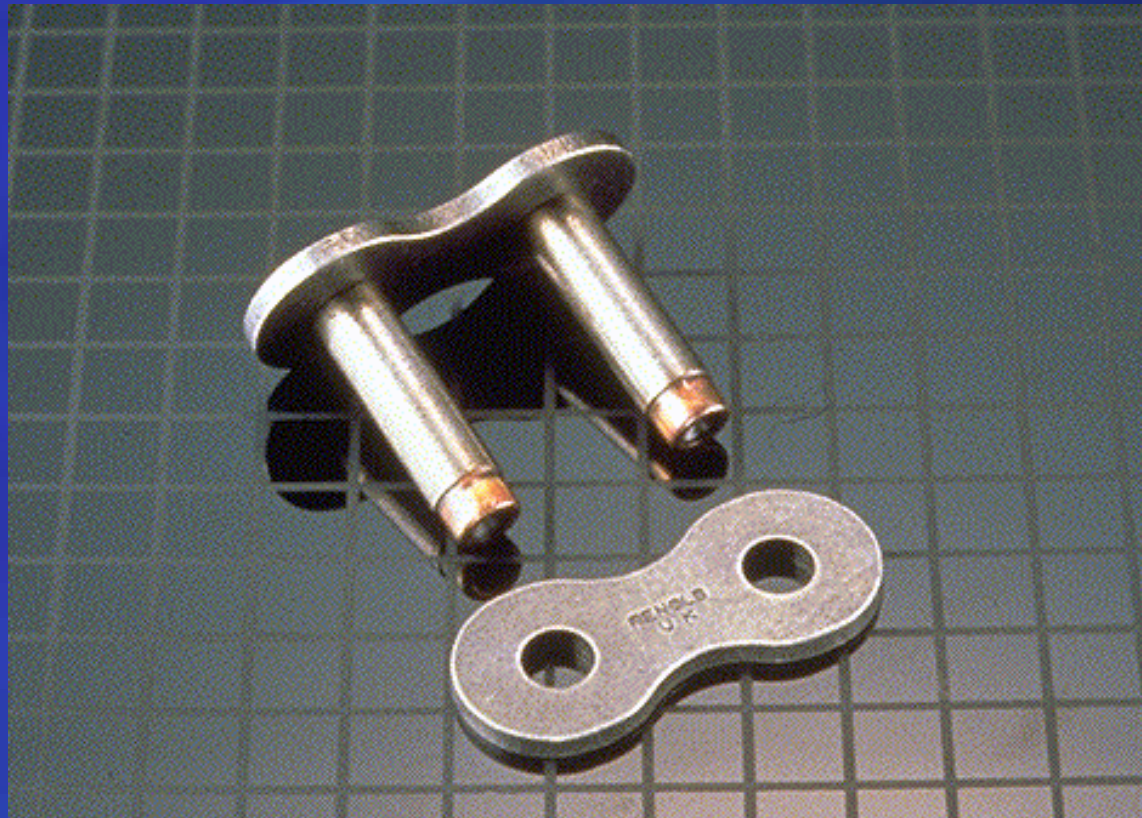


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# Outer Link

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The final part of the chain assembly is the outer link, No.7.  
(when ordered as a spare this becomes a 107)



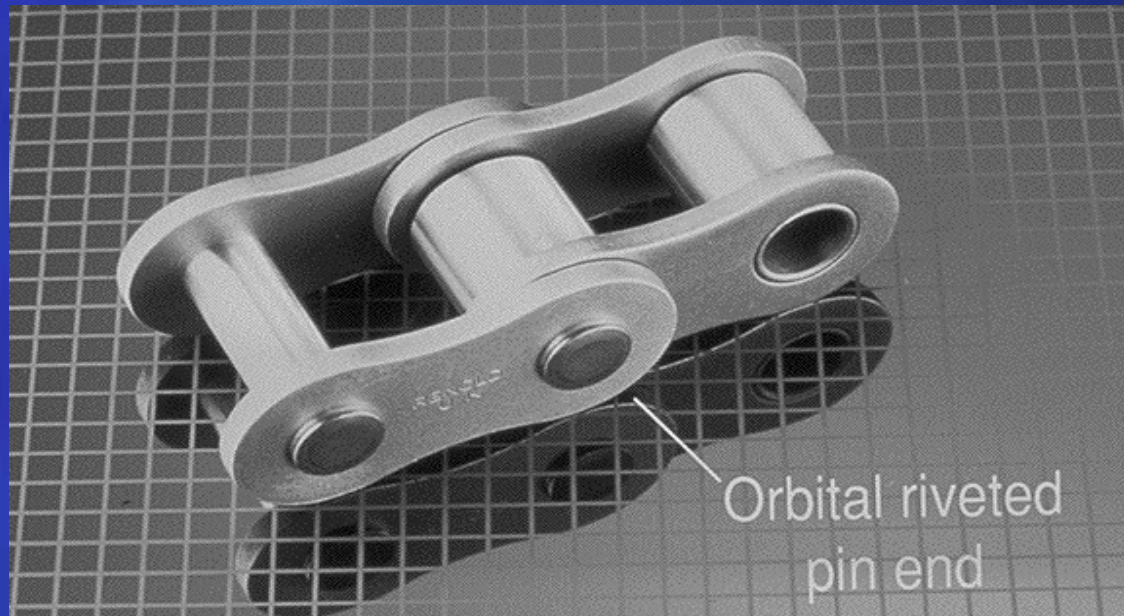
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# Two Pitch Assembly

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The final assembly of two pitches of chain, with a No.7 outer link and a No.4 Inner link

This numbering system is universal, and used by most manufacturers



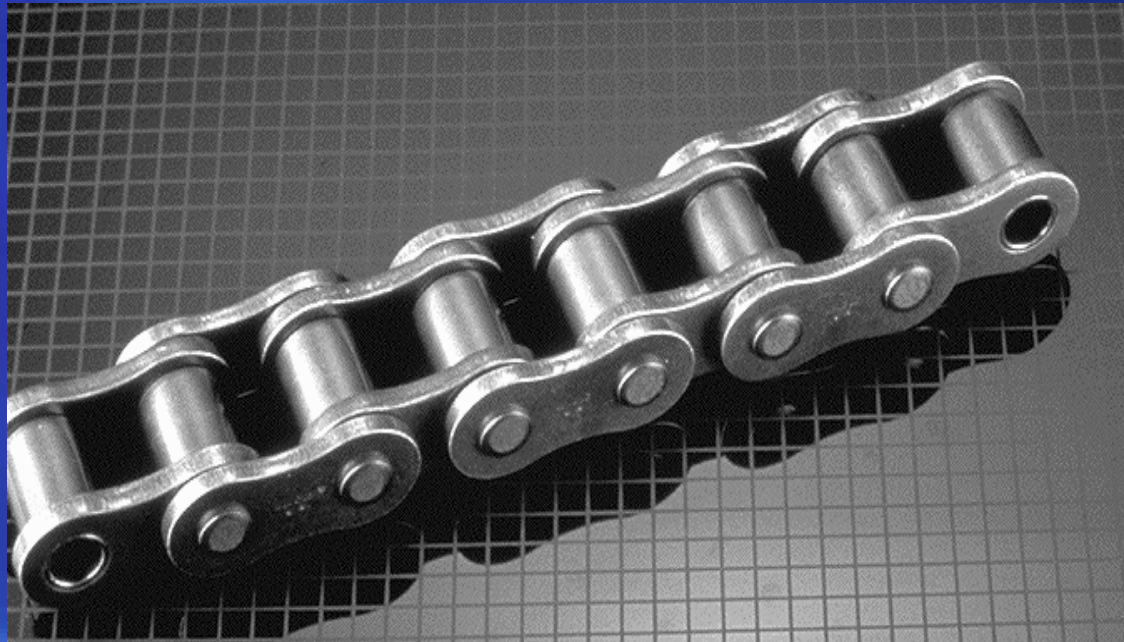
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# Chain lengths

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Only an odd number of pitches can be supplied, the minimum length is three pitches and the piece of chain will start and finish with inner links.

Any other combination will need joints or a cranked link.



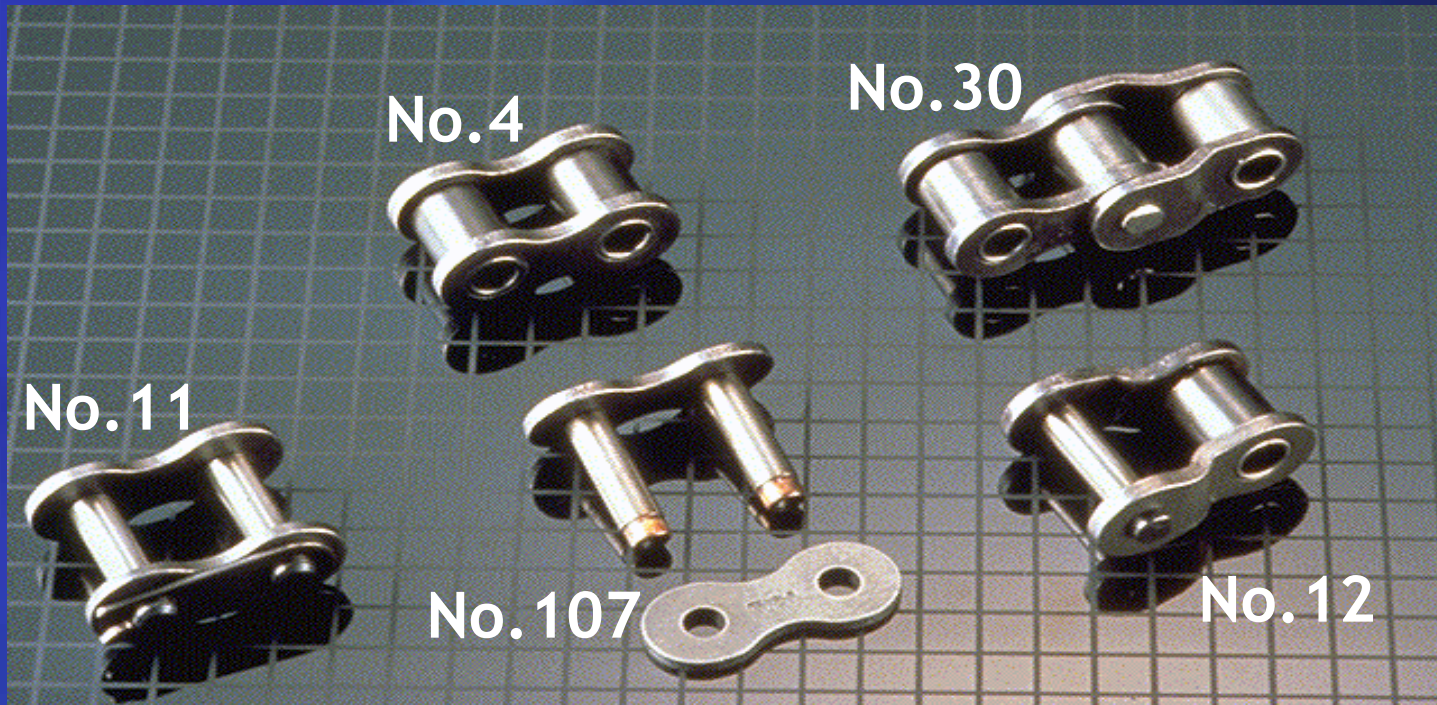
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# Joints

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No.26, No.4, No.107, No.30 and No.12 are the common joints, larger chains sometimes have other variations

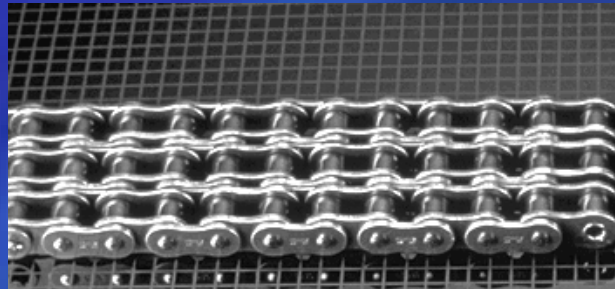


# Chain Configurations

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Simplex, duplex and triplex variations are common  
Up to decaplex (10 strands) is available

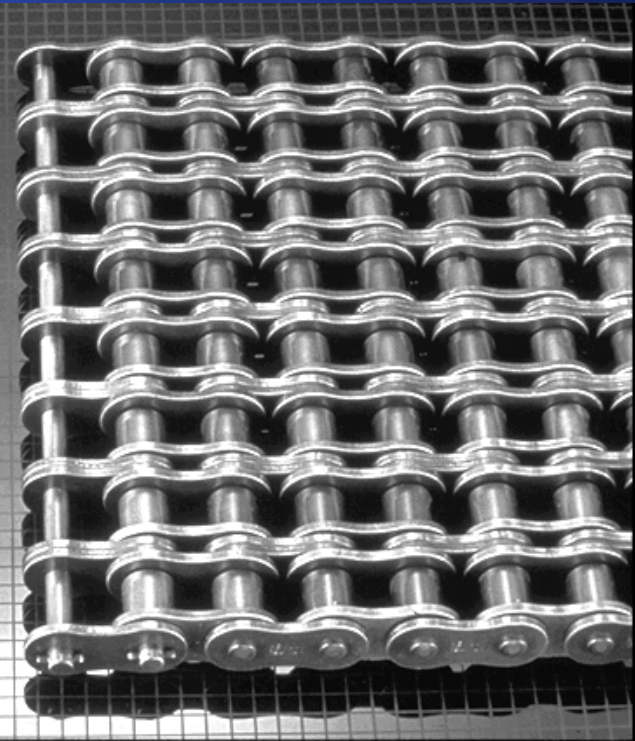
Triplex



Duplex



Simplex



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# Renold Chain Numbering System

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|                                              |                                                                                                                                                      |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1st Digit                                    | 1= Transmission chain                                                                                                                                |
| 2nd Digit                                    | 1= Roller<br>2= Bush                                                                                                                                 |
| 3rd Digit                                    | 0= Simplex BS<br>3= Extended Pitch<br>4= Duplex ISO/ BS<br>5= Duplex ANSI<br>6= Triplex ISO/BS<br>7= Triplex ANSI<br>8= Multiplex<br>9= Simplex ANSI |
| 4 <sup>th</sup> & 5 <sup>th</sup>            | Pitch in 1/8"                                                                                                                                        |
| 6 <sup>th</sup>                              | Series Number                                                                                                                                        |
| 110046 = 1/2" Pitch BS simplex roller chain. |                                                                                                                                                      |

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