



Chain - Part 5: Advantages and Disadvantages

PA NOTE

Like any method of power transmission, chain drives have advantages and disadvantages. Advantages of chain will be discussed initially, and the note will conclude with a discussion of chain disadvantages.

ADVANTAGES

1. Relatively inexpensive.
2. Virtually any length chain can be obtained (splicing).
3. Large selection of chain and sprockets, especially for #80 and smaller chain.
4. Positive drive provides synchronization of two shafts (Synchronous belts such as Poly Chain® also possess this characteristic).
5. Bearing loads are generally lower than for belts (no slack side tension).
6. Chain drives are 95-99% efficient (Poly Chain is 98-99% efficient).
7. Tends to be self-cleaning.
8. Simplicity of design and selection of components.
9. Versatile - large variety of attachments can be adapted (a situation difficult to handle with synchronous belts).
10. Breakable - splice capability allows for varying length and installation on drives where endless chain cannot be installed.
11. Due to chain's symmetric design characteristics, serpentine drives are possible (serpentine drives are also possible using twin tooth synchronous belts).
12. Fixed center drives can be "accommodated" by removing links to take up chain slack (although this is not a recommended practice).
13. Chain tends to be fairly forgiving when misapplied and users are willing to live with poor performance.
14. Chain drives seem to give the appearance that they will do the job - i.e., steel is tough.
15. Chain offers higher HP capacities on smaller diameters.



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DISADVANTAGES

1. Lubrication is critical - unlubricated drives can wear 300 times faster than lubricated drives (difficult to properly re-lube chain).
2. The lubrication attracts dirt which leads to wear problems.
3. Life is usually low since an estimated 90-95% of chain drives are improperly lubricated.
4. Frequent maintenance is required due to wear and stretch.
5. Necessary lubrication is messy (may be a problem in food/beverage industry).
6. Alignment is important as it affects life and stability.
7. Chain drives are noisy (proportional to speed) due to metal-to-metal contact.
8. Linear speed is limited to 3000 ft./min. for roller chain.
9. Vertical drives may present problems since less slack can be permitted than in a horizontal drive in order to insure proper chain/sprocket engagement.
10. Vertical "shaft" drives are generally discouraged.
11. Equipment damage can result upon chain failure due to steel construction.
12. Available only in full box length increments except in rare cases.
13. Smooth speed transfer is not possible due to chordal action.
14. Backlash is significant - chain does not perform well on applications requiring precision positioning.