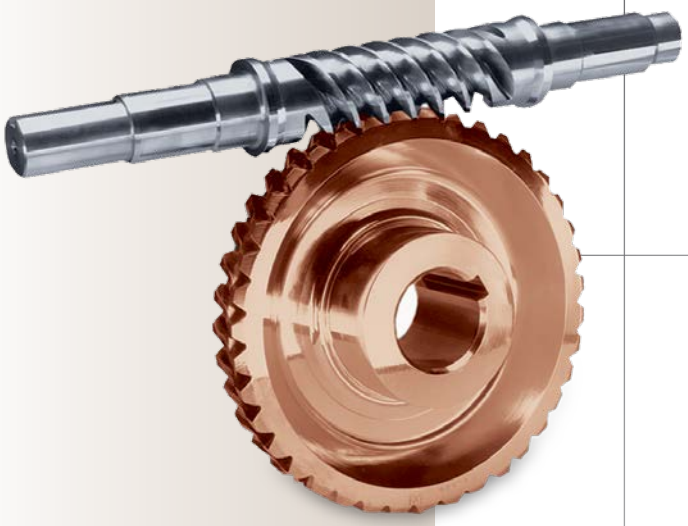


Delroyd Gearing

Matching your Requirements

Beyond Selection

Can you use off-the-shelf gearing?

It is tempting and often advantageous to select standard “Off-The-Shelf Gearing”, but how does the designer know if a reducer or gear set is best suited for your applications?

Whether you are designing a continuous process mixer or a hammer mill, your best value will be in a gear system which is specifically designed for the job or chosen because it happens to be the best for that type of service. Delroyd’s engineers can answer that by sizing and selecting the type of gearing that fits best.

Remember, reliability has a long-term effect on the performance of your product and vitality of your business.

Call Our Toll-Free Application Hotline:

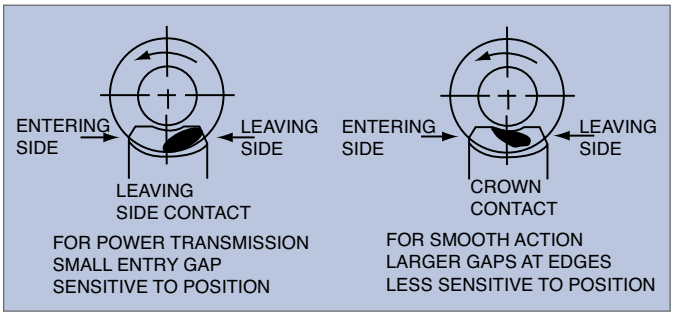
800-432-0121

Delroyd Worm Gear®
Altra Industrial Motion

DELROYD POWER TRANSMISSION

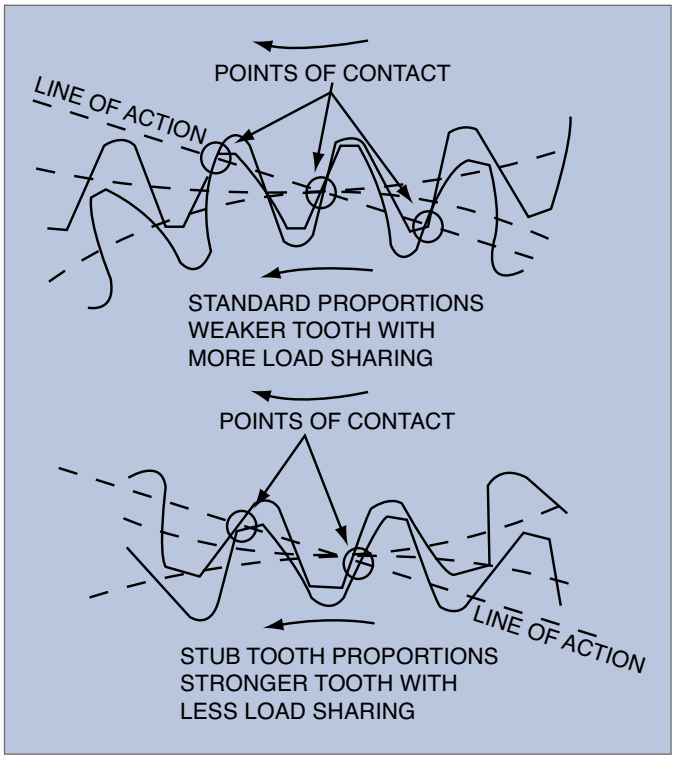
Typically power transmission equipment is specified or selected based on load nature and load cycle. The application data is compared with published ratings of commercially available gearing and a value judgment is made based on cost and projected service life. A designer considering a system with high loads of short duration may not be concerned with durability ratings, since it may be decades before the gears see 1,000 hours under load. Strength rating or bending stress at the root of the gear tooth should be analyzed.

The stub tooth gear is an example of the evolution of gear design. Historically this gearing was used for high strength or heavy shock load applications. Like many design decisions, this was based on experience and knowledge of manufacturing capability. All things being equal, the stub tooth has better bending strength due to its wider and lower profile. It was shown that stub tooth gears would resist breakage from overload or bending fatigue, as compared with gears of standard proportions.



Modern system designers are typically not using stub tooth designs because of low contact ratio. The design geometry of gear teeth has not changed, but newer standard proportion gears often out perform stub tooth gears for strength application. The reason is that newer machine tools generate more accurate gears, so the load is distributed over more teeth on a full depth gear. The stub tooth was more forgiving for gears with teeth that are not evenly spaced and was therefore better if gears were cut on an inaccurate machine. Although contact ratio may not have changed, the effective contact ratio has improved with the accuracy to modern machine tools. So what was worse years ago is better now, and vice versa.

Modern computer models have taken this a step further, where profile modification compensates for tooth deflection under load, allowing for even better load sharing between adjacent teeth. One could imagine a system that performs better under design load than with a lighter load. If the load varies, an effort could be made to design gears to be less sensitive to load variation, which may compromise overall rating. It is clear that there is no best design for all applications.



A worm gear design improvement was made recently in the printing press industry. A web press typically has power transmission type gearing with one gear set used for each roll, (each color). Smoothness and accuracy as well as durability is necessary for overall performance of the machine. A traditional worm gear set with leaving side contact was replaced with a crown tooth/central contact design worm gear. The new gearing has the same loads carried by a smaller tooth bearing surface. By some models, this would not result in better performance. But because of improved gear dynamics and less sensitivity to precise mounting positions, the crown gear was easier and less costly to assemble, and ran smoother and quieter under load. At the first test of a machine built with crown gearing, results were so good that vibration equipment was checked for calibration. There was nothing wrong with the test equipment.

The more information a designer has, the better he can match the gearing to the application. Is it a strength application, a durability application, or something in between? Understanding the load requirements as well as gear performance characteristics will enable designers to choose the best value in power transmission equipment.

Delroyd Worm Gear®
Altra Industrial Motion

www.delroyd.com

2221 Niagara Falls Boulevard
Niagara Falls, NY 14302 - USA
716-298-4100