

Ameridrives

Bauer Gear Motor

Bibby Turboflex

Boston Gear

Delevan

Delroyd Worm Gear

Deltran

Formsprag Clutch

Guardian Couplings

Huco

Jacobs Vehicle Systems

Kilian

Kollmorgen

Lamiflex Couplings

Marland Clutch

Matrix

Nuttall Gear

Portescap

Stieber

Stromag

Svendborg Brakes

TB Wood's

Thomson

Twiflex

Warner Electric

Warner Linear

Wichita Clutch

Flywheel Couplings Offer Compact, Easy-to-Install Options for Construction Machinery



Flywheel Couplings Offer Compact, Easy-to-Install Options for Construction Machinery

Today's construction machinery has to offer robust and reliable operation in some of the most challenging application environments; therefore, the mechanical components used in their design must also offer the highest levels of performance and reliability. Here, Andy Bargh, Business Development Manager for GP Couplings at Altra Industrial Motion Corp., a leading global supplier of power transmission components, examines some of the design considerations for flywheel couplings in different machinery applications.

The building and infrastructure requirements of the developed world are seemingly ever growing, while developing countries are increasingly investing in mechanized alternatives to manual labor. As a result, the demand for construction machinery that can complete large-scale projects in a timely, cost-effective manner and with consistent quality is accelerating, driving the market forwards.

Global forecasts paint a picture of a market that is not just growing, but where the rate of growth is increasing. CAGR estimates from just a few years ago of 7% to 2021 have been revised upwards to almost 8% to 2023, driven by accelerating demand from the likes of the irrigation industry and increasing numbers of highway construction projects.

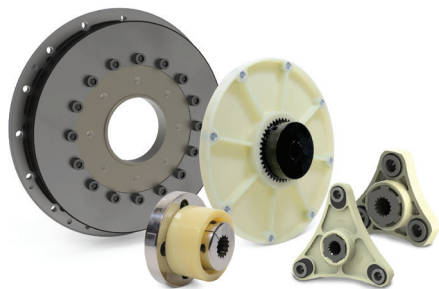
The selection criteria for construction machinery highlight the need for equipment that is as standard as possible, and which gives the best possible service at the lowest cost – and frequently in the smallest possible size. This places stringent demands on construction machinery manufacturers to develop products that improve performance and reliability, simplify servicing requirements, and which can be manufactured with reduced production costs.

This in turn makes the selection of the mechanical components used within the design paramount, and nowhere more so than in the couplings that connect the drive (diesel, petrol or electric) to the driven equipment, such as hydraulic systems, compressors, fans/blowers, generators and pumps. In many of these applications, particularly those involving diesel engines, a flywheel coupling will most often be selected to connect the driver to the driven equipment. But with so many different types of diesel-driven construction machines, each with their own performance requirements, selection of the appropriate flywheel coupling is a far from trivial exercise.

Hydraulic Driven Equipment

Where the diesel engine is to be coupled with hydraulic driven equipment, a prime consideration is how the overall equipment profile can be condensed, and how the OEMs can meet today's increased volume demands at the lowest production costs.

Thus while the flywheel coupling's speed, torque and power specifications have to meet the performance requirements of the particular machine, just as important is the size of the product and its ease of



Altra Industrial Motion has the ability to satisfy all of the performance and functional requirements of flywheel couplings in construction machinery, and has a broad and diverse product offering to suit the needs of individual applications.

installation – ensuring the OEMs can minimize the equipment profile and reap the benefits of simple installation, with repeatable quality, all helping to drive down manufacturing cost.

Since most hydraulic applications are smooth running and direct mounted, either with a pump-to-motor adapter or with a pump plate, torsional vibrations and misalignment tend to be lesser issues than in other construction machinery applications. The flywheel couplings can be torsionally stiff, enabling the speed ranges to be extended above the standard operating speed range of the application.

Products for such applications are typified by the Guardian brand FL Series flywheel couplings from Altra Industrial Motion – a two-piece flywheel coupling with decades of proven success in the field. An economical option, the FL Series flywheel is also highly compact: the entire coupling length is normally mounted inside the housing compartment. Installation is simplified since the coupling requires only a flat steel mounting plate to mount to the hydraulic pump.

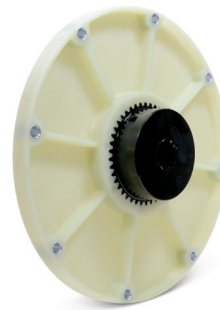
The design consists of a glass reinforced nylon flywheel flange, with a mating hub produced from sintered steel, suitable for use on both splined and straight shafts.

Pumps, Compressors and Generators

While hydraulically driven equipment typically present with smooth loads - free from vibration - and can be connected using torsionally stiff flywheel couplings, this is most definitely not the case for the likes of pumps, blowers, fans, compressors and generators. Being typically base or frame mounted, misalignment can be a concern, and torsional vibration cannot be ignored.

Such applications are often best addressed by a one-piece, all steel flywheel coupling, such as the Guardian FBA Series. Here the flywheel coupling attaches to the engine for easy installation. It takes advantage of elastomeric grommets that provide a steady dampening effect to normal engine vibrations, and help minimize any side loading to the pump shaft. The coupling is suited to a wide range of diesel engine applications, including aerial lifts, skid steer loaders, excavators and low mass compressors.

Another option for absorbing vibrations and reactive forces where misalignment in particular is a concern is the Stromag brand's Periflex CS cardan shaft coupling. The ring element can be screwed directly to the flywheel of the engine. The cardan shaft is flanged to the coupling's B side. Deflection angles of up to 5° are generally permitted, and even greater angles can be accommodated with special versions of the coupling.



The Guardian FL is a two-piece flywheel coupling used on off-highway construction equipment such as skid steer loaders, aerial lifts, excavators, and many other mobile hydraulic applications.



Stromag Periflex® CS couplings are designed for use with piston engines and are connected directly to a cardan shaft.

(Continued)

Torsionally soft couplings are also the best choice for applications involving high mass moments of inertia, and in many cases their design can serve to offer protection to both the engine and the driven equipment in the event of an overload. Guardian Guard-Flex flywheel couplings, for example, have an in-shear design that acts as a mechanical fuse, severing the driver from the driven load when an overload is present. Designed to fail through the rubber and shear, the coupling prevents the equipment from being damaged.

Altra Industrial Motion has the ability to satisfy all of the performance and functional requirements of flywheel couplings in construction machinery, and has a broad and diverse product offering to suit the needs of individual applications. With an appropriate flywheel coupling to address all potential issues, Altra Industrial Motion can offer products from the Guardian and Stromag brands that absorb vibrations and reactive forces, cope with torsional impact, handle high axial and radial loads, and tolerate misalignment. Further, they meet the increasingly important needs of construction machinery OEMs for smaller parts that are rugged, reliable, compact and easy to install.



449 Gardner Street
South Beloit, IL 61080
815-389-3771
815-389-2582 (fax)
www.AltraMotion.com

For a complete list of our
global sales offices visit:
altramotion.com/contactus