

Flender

Innovative Coupling Solution by Flender: Effective Prevention of Stray Currents in Trams and Low-Floor Trains

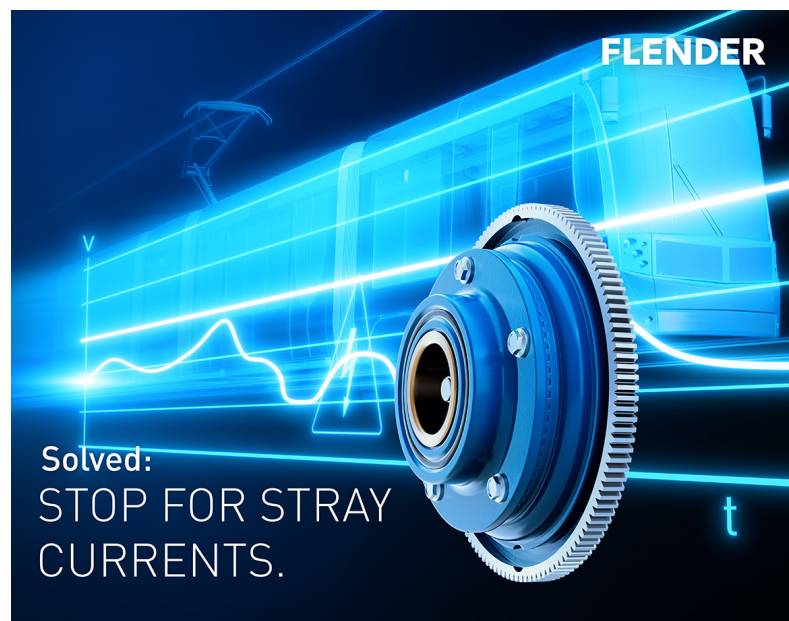
Operators of trams and low-floor trains frequently encounter a significant issue: bearing damage caused by stray currents.

These unwanted electrical passages within the gearbox are increasingly prevalent in metro and locomotive applications, leading to rapid wear of the gearbox bearings. A common component in these rail vehicles is the membrane coupling, which is deployed between the motor and the gearbox.

The Phenomenon of Stray Currents in Detail

When electric current flows from one ring to another through the rolling elements of a bearing, substantial damage occurs. This process is comparable to arc welding, where high current density flows over a small contact area. The material heats up to extremely high temperatures, similar to tempering, hardening or even melting. This results in discoloured areas of varying sizes and eventually leads to the formation of craters where the material of the rolling element has melted and broken off due to rotation. The excess material on the rolling element wears down, causing craters in the raceways and rolling bodies.

Initially, the surfaces exhibit shallow craters that are closely spaced and have a small diameter, even at low current intensity. Over time, this can develop into a washboard pattern, visible on both the raceways and the ball bearings. The balls typically become dull and light to dark grey across their entire surface. The extent of the damage depends on several factors, including

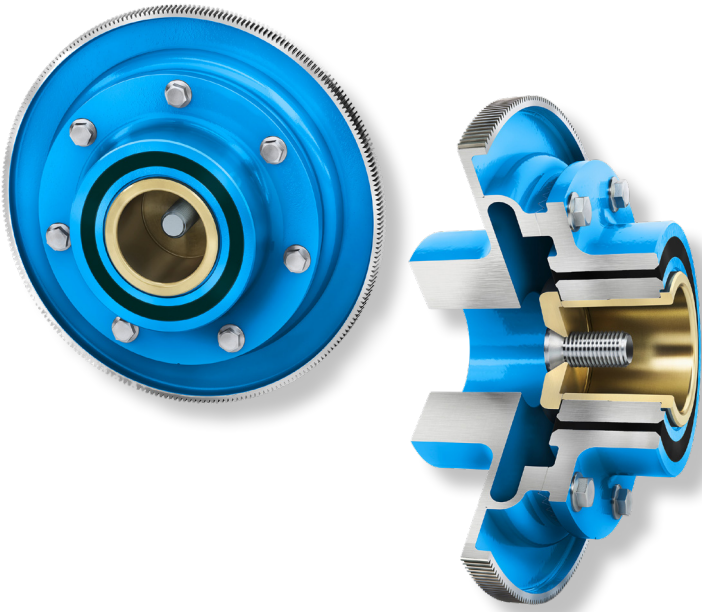


current strength, duration, bearing load, rotational speed and lubricant.

In cylindrical roller bearings, damage from stray currents eventually occurs as well, leading to a washboard surface on the raceways and rollers. The grease in the cage pockets gradually carbonises, loses its lubricating capability and results in surface fatigue, spalling and ultimately sudden seizing.

The Solution: Insulated Membrane Coupling MBG by Flender

Flender offers an effective solution to this problem with its insulated couplings, particularly the membrane coupling series MBG. These steel membrane couplings consist of two coupling halves connected by an



is also possible. Additionally, options such as a slip hub and a speed sensor are available.

ZBG Coupling with Integrated Insulation

In metros with semi-suspended drives, Flender's gear couplings of the ZBG series are utilised. The reason: the high offset between motor and gearbox, rapid acceleration, short braking distances and minute-by-minute stops subject tunnel trains to extreme stresses. Upon request, Flender also supplies the ZBG gear coupling with electrical insulation. This insulation is directly integrated into the coupling, eliminating the need for additional components or interfaces. This removes the need for extra alignment work, simplifying installation and maintenance.

optimised, self-centering face gear. The torque is transmitted via the face gear. Thanks to optimised manufacturing, the membrane couplings provide very high concentricity, which is maintained even after reassembly. Typically, the couplings are balanced together with the rotor of the motor to minimise additional assembly influences.

Electrical decoupling is achieved by integrating insulation within the gearbox-side coupling half, without the need for additional components. The installation of the insulated MBG on the drive is similar to standard membrane couplings and retrofitting existing drives with an electrically insulating coupling

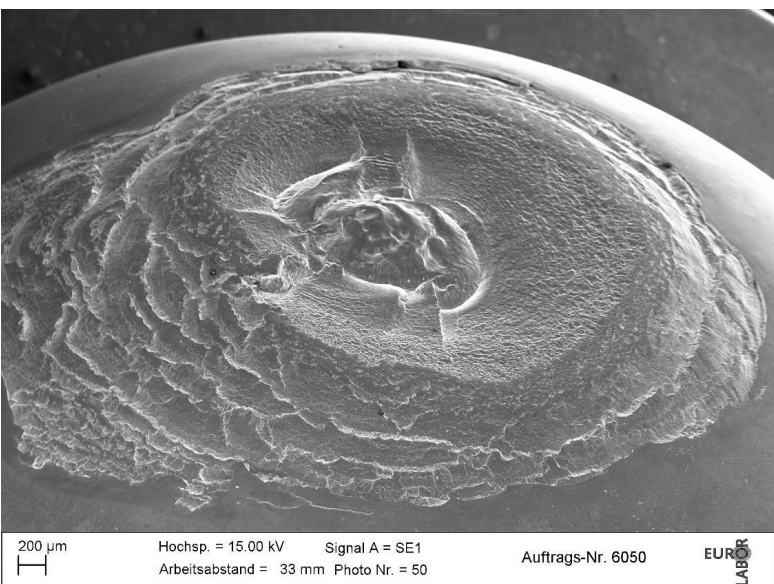
The well-known advantages of the Flender ZBG couplings are fully preserved in efficient rail operations. The ZBG couplings are characterised by their high performance and reliability, making them ideal for demanding metro applications. They ensure reliable torque transmission and contribute to extending the lifespan of gearbox bearings by effectively solving the problem of stray currents.

With Flender's innovative coupling solution, operators of trams, low-floor trains and metros can ensure their vehicles operate smoothly and efficiently at all times. The insulating MBG and ZBG couplings provide a sustainable solution to prevent bearing damage caused by stray currents, thus significantly reducing maintenance efforts and operating costs and improving fleet availability.

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200 µm Hochsp. = 15.00 kV Signal A = SE1 Auftrags-Nr. 6050 EUR
Arbeitsabstand = 33 mm Photo Nr. = 50 LABOR

Craters on rolling element at 500x magnification

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