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Customer
Success
Stories

We pioneer motion

Working together to digitalize rail

In partnership with Schaeffler, Swiss Federal Railways (SBB) has made significant progress with the digitalization of its fleet. The basis for the new life cycle management of bearing data is a data matrix code (DMC) on the axlebox bearings that allows data on the bearing history – from production to operation and maintenance – to be retrieved and shared between various companies worldwide.

This creates a lot of benefits:

- Storage of all bearing-related data over the entire life cycle
- End-to-end traceability of all processes
- Predictive maintenance thanks to timely identification of weak points
- Information gain for process and production optimizations
- Enabler for 100% return service within the framework of bearing reconditioning
- Basis for fast, reliable and sustainable action

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 SBB CFF FFS

Customer

Schweizerische
Bundesbahnen AG (SBB,
Swiss Federal Railways)

Industry

Rail

Fleets

- Flirt intercity and regional
multiple units
- Regio-Dosto
- IR-Dosto
- IC2000
- ICN
- FV-Dosto
- Giruno

SCHAEFFLER

What drives our customers and what Schaeffler offers ...

The challenge

SSB was focusing primarily on digitalization and sustainability with a view to making the company fit for the future. Two of the most important issues associated with axlebox bearing maintenance were:

1. Collecting product data: Manufacturing data (manufacturing location and date, axial clearance, grease quantity, type and batch), operating data (service life, hot box detection report, vibration data, grease analyses) and reconditioning data (condition, measured values, photos).
2. Systematic reconditioning of rail bearings with the aim of achieving a 100% return rate.

There was rapid consensus that the direct exchange of bearing data based on a data matrix code (DMC) to GS1 standard needed to become the focus of the collaboration in order to meet these goals.

The technical implementation turned out to be much more challenging. Both parties had to link a lot of different systems with one another to enable the digital data collection. Schaeffler achieved this by:

- purchasing a laser marking system to apply the DMC during the manufacturing process
- establishing a Schaeffler-EPCIS interface for direct data exchange with the customer



Product data are read automatically with a scanner.

DMC: One code changes everything

A serialized Global Trade Item Number (GTIN) is encrypted in a machine-readable GS1 data matrix barcode. This in turn is lasered directly onto the inner and outer ring of the bearing. A laser-engraved barcode like this is the best option in harsh environments where labels could potentially fall off.

It allows Schaeffler and its customers the necessary traceability over the entire production and value creation chain – from the place of manufacture to operation, maintenance and repair work.

In short, the DMC creates the prerequisite for generating a digital twin of the bearing. It provides information and details of the features of an axlebox bearing throughout its entire life cycle.



The digital twin enables comprehensive life cycle management.

How does it work?

The DMC always consists of at least two blocks:

- (01) – Identifier / Global Trade Item Number
- (21) – Serial number / Rail serial number

Other data can be added as blocks 3 and 4:

- (90) – Various / Variable data
- (10) – Batch / Lot number

Two-pronged solution

Digital maintenance

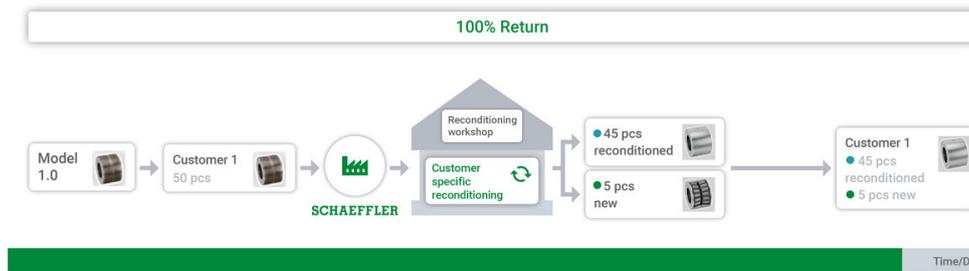
Since having the DMC applied to the axlebox bearings, SBB has been able to manage rail vehicle maintenance at component level. The history of a new axlebox bearing, installed and commissioned for the first time, is allocated to a specific vehicle in serialized form. Once the bearing is in operation, other defined operating data are continually added to its digital twin, allowing maintenance intervals and overhauls to be scheduled efficiently.



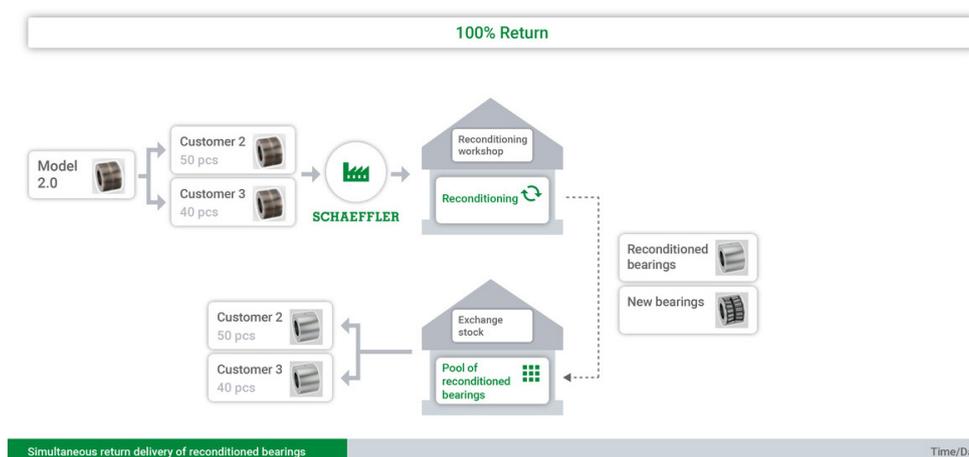
Digital maintenance: The DMC on the axlebox bearings allows SBB to correlate damage patterns with operating data like service life, route profile or wagon load.

Reconditioning: Data exchange based on a data matrix code

For every axlebox bearing that SBB sends to Schaeffler for reconditioning, we send back a fully functioning bearing for the upcoming operating cycle. This **100% Return** service offers our customers **100% predictability**. There are two models to choose from.



Model 1.0: Following reconditioning, the customer gets back exactly the same bearings they sent in. We automatically replace defective bearings, so that the customer always has an identical number of bearings in stock again.



Model 2.0: This model offers immediate delivery of compatible, reconditioned bearings. In other words, as soon as our customer notifies us that they are sending a batch of bearings for reconditioning, we send them compatible, fully reconditioned bearings from our inventory. In doing so, we guarantee full functional reliability for the upcoming operating cycle.

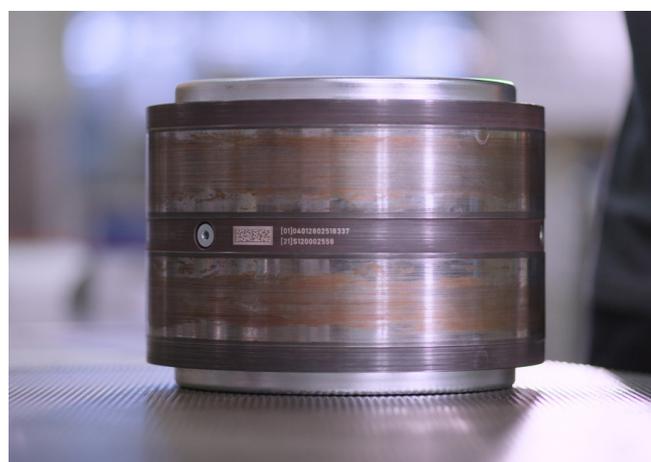
Advantages of digitalization

SBB is blazing a trail

In the course of the pilot project with SBB, a comprehensive exchange of data on the axlebox bearings used and the 100% return bearing reconditioning service using the Model 1.0 option were successfully implemented. Both processes are functioning successfully and reliably in practical operation.



Transparency is good – better processes are great



With a data matrix code (DMC) as shown on this axlebox bearing, every single bearing can be clearly identified over its entire service life.

Thousands of axlebox bearings under digital management

The key advantages for SBB are:

- Simple information about the number of bearings installed
- Fast identification of those bearings showing excessive signs of wear

This is a huge help to SBB when it comes to permanently improving the availability of rail vehicles and reducing fault-related outages to a minimum.

Reconditioning of bearings

A further advantage is the general optimization and acceleration of maintenance processes, especially through the reconditioning of bearings. So far, around 2,500 bearings have been reconditioned based on the 100% Return Model 1.0. This has reduced SBB's workload enormously, because we replace all defective bearings and send them back along with the reconditioned bearings.

Savings thanks to reconditioning of axlebox bearings compared with new production:

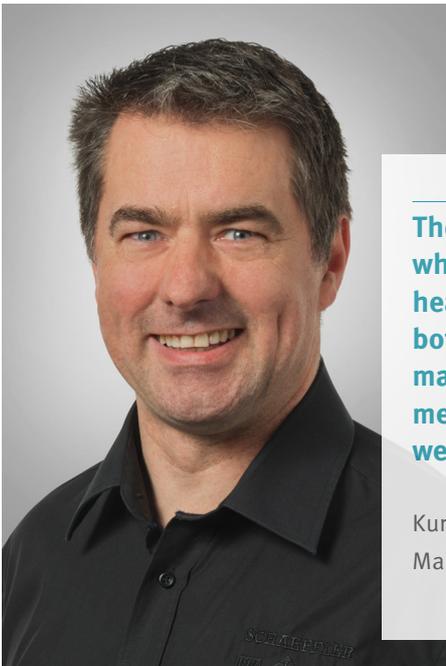
Total saving		equivalent to		
CO2 saving [t]	534		one car journey of	3.2 million km
Energy saving [MWh]	1923	one rail journey of	12.4 million km	
Water saving [m3]	7055	one flight of	2.2 million km	

More quality on the railways

Advantages of digitalization for OEMs and rail operators

As a supplier of components for the rail segment, Schaeffler continuously helps the rail sector compete effectively with other modes of transport and is investing heavily in digitalization and the optimization of the entire supply chain.

We see ourselves as partners to our customers and can leverage our specific knowledge of standardized product marking by DMC to profitable effect in the railway system.



The collaboration with SBB is a good illustration of where the digitalization journey in rail operations is heading and how the mutual exchange of data benefits both parties. Identifying weak spots in good time helps manufacturers, operators and passengers in equal measure. We have a pioneering solution package that we now want to open up to the market.

Kurt Baumgaertner
Manager Reconditioning at Schaeffler

One SBB for four markets

The SBB Group is divided into the three divisions Passenger Transport, Infrastructure and Real Estate, plus the group company SBB Cargo. These are supported by corporate and service functions including HR and Finance.