Plough new ground

with SKF Agri Solutions for the agriculture industry

The Power of Knowledge Engineering

Meeting the growing challenges

# of modern farming

No two farms are exactly the same. Size, location, elevation, climate, soil structure and crop rotation all combine to create a unique enterprise. Even so, every farm's equipment has to endure many of the same challenging conditions. Mud, dust and debris. Extreme heat and cold. Rain and runoff. Corrosive chemicals. And long periods of inactivity followed by intense work schedules that test the limits of a farm's equipment and its workforce.

In addition, many farmers must deal with pressures resulting from rising fuel costs and other economic factors, as well as new regulations that will impact their cropping profits. These range from requirements to reduce harmful emissions and noise, to protecting the health and safety of workers.

To optimize productivity, farmers are looking to manufacturers to help them increase machine speed and efficiency, reduce or eliminate maintenance and downtime, and automate processes previously handled manually. Manufacturers, in turn, are collaborating with trusted suppliers and engineering partners to design and build a new generation of equipment with greater reliability and functionality.

Design for reality with SKF

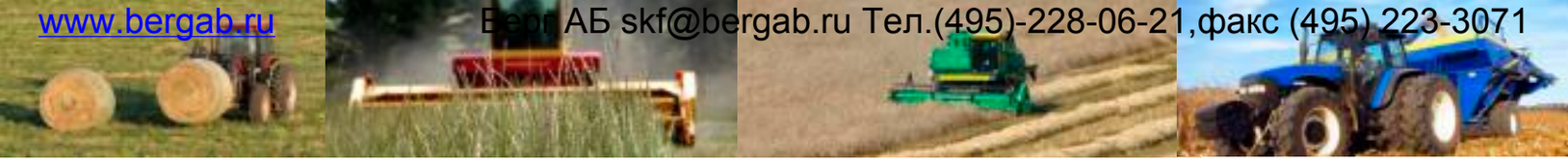
At SKF, we understand the needs of farmers. We've walked their fields with them, discussed their challenges and concerns, devised solutions that solve real-world problems, and then put these solutions to the test not only in our labs, but on actual working farms. Whatever your product – from a complex combine to specialized attachments for virtually any farm application, SKF has the experience and capabilities to deliver the benefits you and your customers value:

OEM benefits:

- **Integrated, pre-assembled solutions**
- **More robust designs**
- **Reduced time to market**
- **Simplified assembly**
- **Differentiated product offerings**
- **Reduced warranty costs**

End user benefits:

- **Lower costs per hectare**
- **Reduced maintenance**
- **Longer equipment service life**
- **Reduced fuel and grease usage**
- **Greater automation and precision**
- **Machines with higher work capacity**
- **Improved safety and comfort**



Sowing the seeds of innovation with SKF

With expertise in bearings, seals, lubrication, services, and mechatronics (combining mechanics and electronics into intelligent systems), SKF is uniquely qualified to partner with agricultural equipment manufacturers. By drawing on one or more of our core competencies, we can help you create more fully integrated solutions that can improve farm productivity in many ways, from reducing downtime for maintenance to enabling more functions to be handled in a single pass.

Reduced maintenance

By minimizing or eliminating the need for disassembly and relubrication of components, SKF's unitized and integrated solutions can reduce maintenance costs. For example, field testing of sealed SKF Agri Hub units for tillage equipment confirms that as much as a half hour of maintenance time can be saved per day, per machine, compared to conventional bearing arrangements that require daily re-greasing.

Additionally, SKF centralized lubrication systems automate the lubrication of the many rotating and oscillating joints in an agricultural machine, many of which are difficult and possibly dangerous to access. Lubrication can be independently adjusted for the different sections of the machine and in accordance with the work cycle. Condition monitoring of the grease sub-system can be integrated into the vehicle's onboard computer to provide instant diagnostics.

SKF mud block cassette seals, specifically developed for heavy duty applications such as front and rear tractor axles and transmissions, extend bearing life and increase uptime by preventing ingress of contaminants and water.

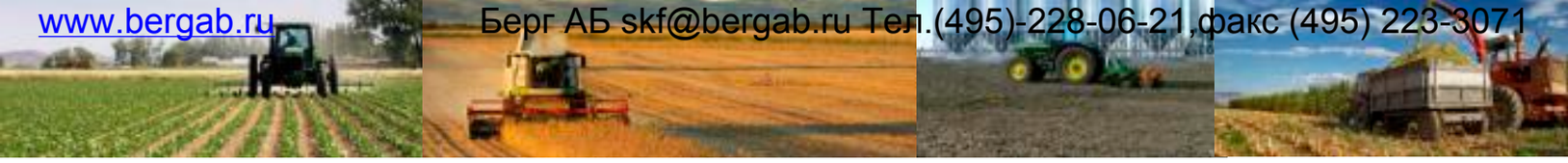
SKF automatic lubrication systems replace manual lubrication with highly controlled dynamic lubrication – applying precisely the right amount of lubricant while the machine is in motion. These programmable systems can be tailored for different machines and operating conditions.

Improved reliability

Unexpected downtime due to farm equipment failure is costly in terms of lost productivity and costs for replacement parts and manpower. By looking at your design from a systems perspective, SKF can help you build in even more reliability and, thus, more value. Combining high quality SKF components can result in machines that perform better and longer, resulting in higher productivity, lower maintenance costs, reduced need for spare parts and, ultimately, higher cropping profits.

One example of this systems approach to design is an SKF hub unit developed to support the forks in tillage machines. This power harrow unit combines a flange, shaft, double row tapered roller bearing, patented SKF R-Safe seal and specialized SKF grease to extend bearing service life by a factor of about 7, compared to conventional designs.*

*Results based on SKF testing.



knowledge engineering

Greater precision

Large or small, farms are becoming more high tech, with a growing emphasis on precision. From sensors that can read and communicate soil conditions such as humidity and consistency, to GPS-guided systems that control vehicle movement precisely, the next generation of farm equipment will take advantage of every technology.

SKF can deliver integrated, sensorized units that embody farming application knowledge and multiple areas of SKF expertise. One example is a cabin positioning and leveling unit that allows equipment operators to always face the work direction, improving ergonomics, safety and productivity. Developed with SKF simulation software, the unit rotates on a high quality SKF slewing bearing and includes advanced sealing technology, a positioning sensor system, and an automatic grease distribution system.

A compact SKF steer-by-wire unit, fitted into the armrest of a tractor, enables the farmer to rotate the seat 180° for more accurate backwards steering.

SKF Y-bearing units not only reduce lubricant use significantly, they reduce the risk of lubricant spillage, helping to protect both the environment and crops from contamination.

Reduced environmental impact

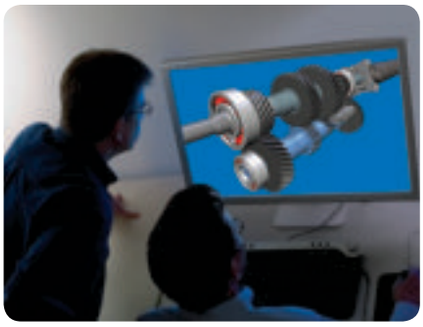
SKF Agri Solutions can help farmers reduce their environmental footprint in a number of ways. Sealed-for-life, relubrication-free hub units reduce grease usage and the potential for grease spillage. Electromechanical actuation of attachments in agricultural machines minimizes or eliminates the use of hydraulics and the risk of hydraulic fluid leaks. And there is the additional benefit of drawing power only when in use.

Sensorized control units can deliver significant environmental benefits, as seen by the use of GPS-based, steer-by-wire systems for precision steering during spraying, seeding, and tillage. A customized SKF sensor unit in the vehicle's steering column precisely controls steering to avoid overlapping of tracks, saving the farmer time and seeds, while minimizing chemical use and fuel consumption.

Grow your business with SKF

At SKF, our goal is to be a leading provider of best-in-class solutions for the agriculture industry. With decades of experience in the industry, we are confident that we have the knowledge and technical competency to help you meet your customers' productivity and sustainability goals. Along the way, we can also help you be even more productive and profitable by:

- Applying the power of knowledge engineering to address the needs of the marketplace
- Providing sophisticated engineering services including dynamic modelling and simulation
- Optimizing not just components, but systems and sub-systems
- Speeding up your design, testing, and validation process
- Delivering drop-in and plug-in solutions that reduce assembly time
- Supporting your goal of fewer component parts and suppliers
- Improving equipment reliability, efficiency, and functionality
- Reducing warranty claims and related costs
- Supporting your needs with a global manufacturing footprint
- Minimizing supply chain costs with a global distribution network



Functioning as a virtual test rig, SKF's dedicated modelling and simulation tools can solve complex and dynamic issues, and help you meet noise and vibration reduction goals.

SKF is a company that is committed to quality, with just one standard of excellence all over the world. We have incorporated the Design for Six Sigma business process methodology across our entire organization, helping us to first identify the true needs of customers, and then drive those needs into a successful product solution.

Looking for a strategic partner with the resources you need today – and tomorrow? Consider the advantages of partnering with SKF, and of involving our agriculture industry specialists early on in your product planning and design process.

See inserts for more details about SKF Agri Solutions for the agriculture industry or visit us at **www.skf.com/agrisolutions**

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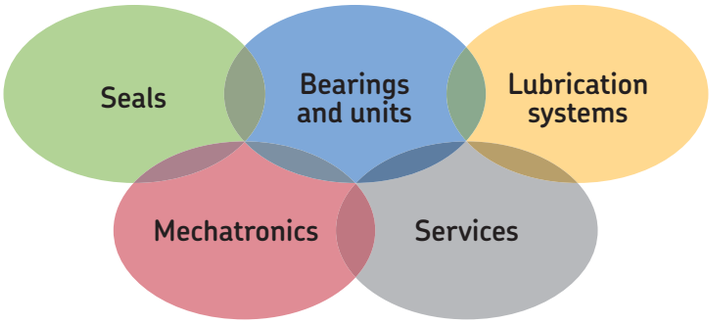

The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry worldwide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management services. A global presence provides SKF customers uniform quality standards and worldwide product availability.

PUB 46/S2 10108 EN · September 2009

Printed in Sweden on environmentally friendly paper.

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