



# Proactive Reliability Maintenance

A dynamic process for eliminating recurring machine failure

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# SKF Proactive Reliability Maintenance

Because it's better to *eliminate* downtime than *predict* downtime



Two trains, riding on the same track, are speeding toward each other at a speed of 150 kilometres per hour. If at 12 noon the trains are 300 kilometres apart, at what time will they collide?

Before you answer that, consider how much better the outcome would be if you could take steps to keep the trains from ever colliding. That, in simple terms, is the difference between predictive maintenance and Proactive Reliability Maintenance.

Much more than just the latest industrial buzzword, Proactive Reliability Maintenance is a proven process to help:

- Prevent recurring machine failure
- Reduce maintenance costs
- Increase machine uptime and product quality
- Safely extend the life of equipment
- Optimize plant asset efficiency
- Improve your planning process
- Empower maintenance and operations to succeed

An impressive list of benefits, to be sure. How can SKF deliver them? By enabling you to not only foresee and plan for machine shut-down (Predictive Maintenance), but to eliminate the root cause of the failure altogether through Proactive Reliability Maintenance.

## Have a good Predictive Maintenance programme in place? Take it to the next level with Proactive Reliability Maintenance

Some of the world's best-run industrial facilities have discovered that a well-implemented and managed Proactive Reliability Maintenance process is the most effective method of managing risk, increasing reliability and helping to provide the best possible return on plant assets. Depending on the current level of sophistication of your reliability efforts, SKF will design and implement a Proactive Reliability Maintenance programme for your operation from scratch, or build on programmes and systems already in place.

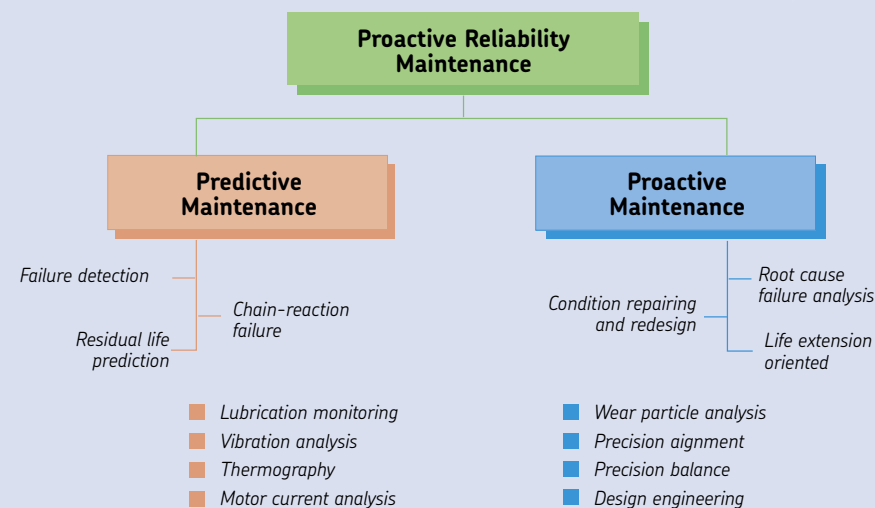
## Implement a plant-wide programme, or start with a single section

Depending on your needs and goals, SKF can design and implement a Proactive Reliability Maintenance programme for your entire plant or only for a specific section with a history of recurring failure. SKF will supply all necessary hardware, software and technical resources and manage the complete process, from implementation to periodic operational reviews. We can also provide the consulting services, technologies and training you need to initiate and manage the programme on your own.

## A dynamic process that helps eliminate "routine" machine problems

Every industry has recurring machine problems associated with particular applications. Because they are so common, they are often considered "facts of life" in the plant, simply one of the costs of doing business in your industry. Every so often, machines just need to be shut down for "routine" maintenance.

Or do they? Proactive Reliability Maintenance enables you to redefine what is routine, or unavoidable, by addressing equipment failures and implementing the processes necessary to prevent their reoccurrence. At its foundation is a systematic method to benchmark asset productivity and implement corrective actions that will reduce total life cycle costs. While traditional Predictive Maintenance processes only predict machine failures, the Proactive Reliability Maintenance process identifies the root cause of these failures and prescribes measures to prevent their reoccurrence. Proactive Reliability Maintenance goes one step beyond Predictive Maintenance, changing the way machine failures are handled: from reactively finding and fixing them, to conducting a structured analysis that helps eliminate future failures.



# The SKF Proactive Reliability Maintenance process is based on four key elements

## 1. Predictive Maintenance

Predictive Maintenance is aimed at detecting a machine condition that will eventually lead to failure, the severity and consequences of this failure. To do this, sophisticated condition monitoring technology is used to gather data such as machine vibration, thermography, lubricant condition, motor current analysis, and process parameters. While most Predictive Maintenance programmes stop at detecting a problem and making a residual life prediction, SKF uses this information as the basis to diagnose the problem, on-site or via a central SKF diagnostic centre, and determine which proactive tasks are necessary to increase machine availability.



## 2. Diagnostics and root cause failure analysis

An SKF Proactive Reliability Maintenance programme draws on the considerable experience of SKF engineers to extend machine life. Applying knowledge and decades of accumulated experience to diagnose collected data, these machine specialists make recommendations for actions such as precision alignment, precision balancing, alterations in lubrication management, and improvements to or redesigns of machines or critical components. To complement the knowledge derived from the diagnosis of data, detailed machine and component diagnostics are conducted on site, or at a centralised SKF diagnostic centre.

Damaged or failed components are subjected to a thorough root cause failure analysis. The results are used to prevent a recurrence of the problem or, in some cases, to assist your original equipment manufacturer partners in a redesign of the machine.

## 3. Key Performance Indicators

Key Performance Indicators are performance improvement targets established jointly between plant management and SKF. Typically, these cover a range of areas, from unplanned mechanical downtime and product quality to plant efficiency, maintenance costs, and bearing performance. Key Performance Indicators are also used to determine the skills personnel need to maintain machine performance (e.g. lubrication, mounting, alignment). Where possible, once a Key Performance Indicator is achieved, a new target is set to facilitate continuous improvement.

## 4. Operational review

The success of a Proactive Reliability Maintenance programme in achieving established Key Performance Indicators is monitored through a periodic review of the total programme. Results are documented and presented at performance review meetings between plant management and SKF. These meetings also help to make sure that the process is continually refined to achieve the best machine performance.

## Integrated decision support

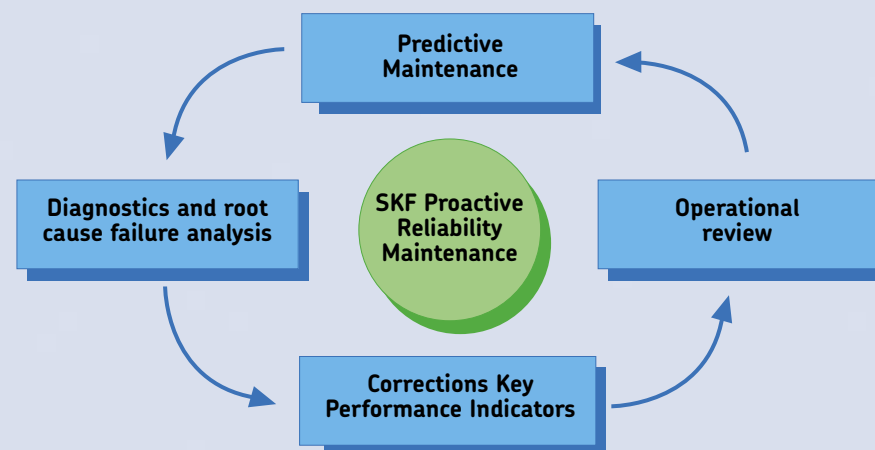
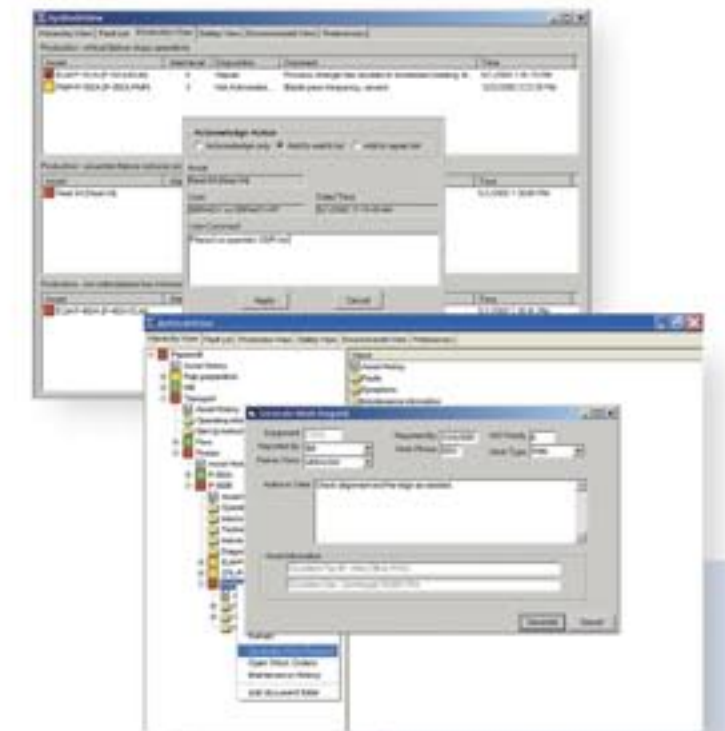
The SKF Proactive Reliability Maintenance process is enhanced by the @ptitude® Industrial Decision Support System from SKF, a modular solution that helps improve overall plant efficiency by replacing labour-intensive data collection and analysis with automatic analysis, fault resolution and work order notification.

By integrating data from multiple sources into one easy-to-use application, the system applies a structured approach to capturing and applying knowledge. It facilitates consistent, efficient, and effective decision-making by enabling workers to make decisions quickly, based on meaningful data and a predetermined set of procedures and priorities.

The @ptitude system allows users to efficiently and effectively utilise the data made available through plant systems, providing a dynamic resource for machine and process diagnosis, analysis, reporting and corrective actions. The @ptitude system integrates SKF's range of competencies with data from other systems, such as condition monitoring, distributed control, computerized maintenance management systems, and your own organization's internal knowledge.

## Maintenance strategy review

For maximum benefit to be realised from Proactive Reliability Maintenance, actions need to be based on a solid and accurate understanding of the plant's critical machines and their current maintenance strategy. For this reason, the most successful Proactive Reliability Maintenance processes begin with a maintenance strategy review that identifies failure modes and causes, machine criticality, and the tasks required to prevent failures from reoccurring. Intelligence gained during this process makes sure that the right maintenance is performed on the right machines at the right time. Without this insight, the executed Proactive Reliability Maintenance process may ultimately be less effective.



# Complete solutions from the world's most experienced experts

Once you've decided your operation can benefit from Proactive Reliability Maintenance, the next step is deciding if you should execute the process in-house or choose a company to manage it for you.

For many facilities, the clear choice is SKF.

With decades of experience, SKF has knowledge of rotating machine reliability that is unmatched in the world. Close working partnerships with our customers have given us a unique and intimate understanding of the processes and challenges specific to every major industry. And as a technical partner to original equipment manufacturers worldwide, we may have even had a role in the design of your machinery.

Through SKF, we have brought together in one place the collective knowledge of the world's most experienced machine reliability specialists. These individuals are working in this highly specialized field on a daily basis, eliminating the learning curve that your plant's own staff would need to overcome.

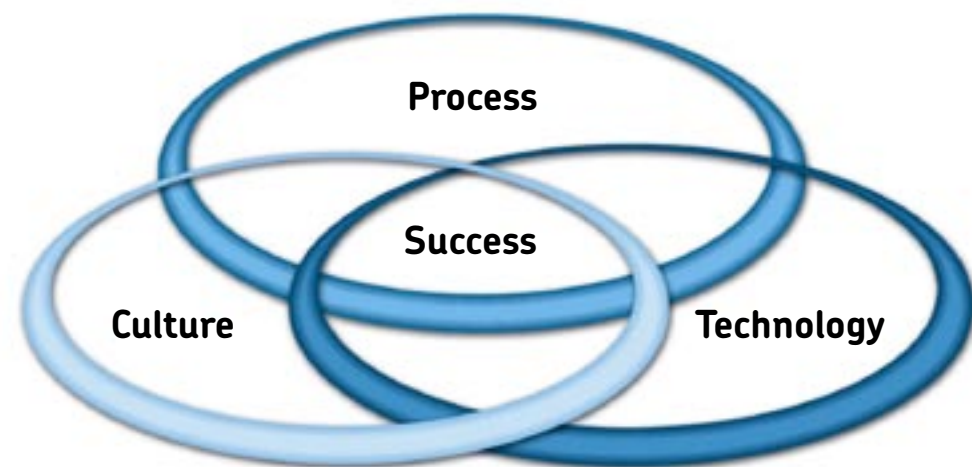
No other company can provide the full range of technology, consulting, and services available from SKF. No company is better prepared to design and implement a customised Proactive Reliability Maintenance programme for your plant.

## Determining if SKF Proactive Reliability Maintenance makes sense for you

Many companies are eager to sell you the technologies they offer. SKF is committed to first understanding your situation in order to gauge the potential return on investment you can expect from Proactive Reliability Maintenance. SKF begins the process with a client needs analysis that identifies precisely where your maintenance is today and how to improve it.

## Performance-based contracts

Proactive Reliability Maintenance is a dynamic process that requires ongoing involvement by SKF engineers through an annual service contract. You may wish to specify a performance-based contract, under which SKF's performance is measured against agreed upon Key Performance Indicators. This type of contract reduces risk for customers and demonstrates SKF's commitment to the success of the program.



# Real-world SKF Proactive Reliability Maintenance success stories



## Paper industry

A large paper mill was experiencing frequent and unexpected failures of critical equipment. Not only were unexpected failures creating a reactive maintenance culture, but also significant operational reliability problems, including high quality losses, which amounted to millions of euros.

SKF conducted a total mill assessment including operational reliability and maintenance processes. After pinpointing the root cause of operational failures, SKF implemented a Proactive Reliability Maintenance programme aimed at improving machine reliability and eliminating unplanned downtime.

The Proactive Reliability Maintenance programme enabled the customer to reduce unplanned downtime by **70%** and cut the mill's quality losses by **30%**. In addition, the improved reliability led to record production rates. The successes reinforced the proactive cultural changes that accompanied the implementation of the programme. The total positive impact for the mill is **€1 200 000** and counting.



## Chemical industry

Recurring fan failures in the process area of a chemical manufacturing facility resulted in a Mean Time Between Failure measured in months rather than years. Excessive fan failure was costing the company on average €7 500 per fan to repair. Production downtime from fan failure was estimated at €40 000 per hour. Additional losses from scrap product being sold at discount were also incurred.

SKF conducted a complete fan system assessment to pinpoint the root cause of recurring failures. SKF then recommended specific improvements, and then employed the Proactive Reliability Maintenance process to maintain reliability improvements and eliminate unplanned downtime.

As a result of the Proactive Reliability Maintenance programme, the customer was able to increase plant productivity and reduce maintenance costs, resulting in bottom line savings for the plant in excess of **€2 500 000**.

For more information on how the SKF Proactive Reliability Maintenance process can benefit you, contact your SKF representative, or visit us on-line at [www.skf.com/reliability](http://www.skf.com/reliability)