2018 Portfolio & Schedule for Canada

SKF Training Solutions

2018

SKF Training Solutions

SKF Training Solutions:

Lubhani Sharma
928 72nd Avenue NE
Calgary, Alberta T2E 8V9

- Tel: 403-519-1655
- Email: training.canada@skf.com

Dear Readers,

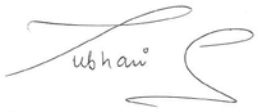
With so many advancements in the world of business, science and technology, it is imperative that businesses find the best opportunities to train their employees to stay ahead of competition and achieve their bottom line. The world-class experience offered by SKF, is exactly what the employees need and therefore it is not just a next step, but perhaps the most important step for them to advance their career and increase efficiency & productivity.

Our training courses have been developed with over 100 years of experience and knowledge of rotating equipment reliability that is unmatched in the world. Our close working relationships with equipment owners and designers have given us an intimate understanding of the processes and challenges specific to every major industry within the continuously evolving global community.

We have a variety of assessment programs available to help you generate an effective training development plan for your team. Our skilled instructors can come to your facility to provide on-site training that is customized to your team's operation and needs.

SKF Training Solutions, SKF Canada Limited is recognized by the Society for Maintenance & Reliability Professionals (SMRP) as an approved provider of continuing education and training aligned with key subject areas related to reliability and physical asset management.

For 2018, we are continuing to tour the country, offering our most popular courses at several new locations. If your location is not listed, please contact SKF so we can add your location to 2019 or possibly make arrangements for 2018.



Lubhani Sharma

SKF Training Solutions Canada

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Public training locations

- English language course
- French language course

We can come to you, contact us at: training.canada@skf.com to setup a training in your city.

Certifications

Society for Maintenance & Reliability Professionals is a nonprofit professional society formed by practitioners to develop and promote excellence in maintenance, reliability and physical asset management while creating leaders in the profession.

SKF Canada is a training organization accredited by the "Commission des partenaires du marché du travail (Emploi-Quebec)" for the purpose of applying the law favouring the development and recognition of competencies of the workforce. Agreement certificate number: 0056417

International Council for Machinery Lubrication is a non-profit organization dedicated to helping lubrication practitioners succeed in thier professional careers.

CMVA is a non-profit association whose fields of interest include machinery dynamics and all aspects of condition monitoring and predictive maintenance of machinery, especially vibration monitoring and analysis.

Customer first, always

It has never been more important to keep our focus simple and strong.

We live in exciting times. In the next few years the world will see opportunities and face challenges on a scale never seen before.

Rapid technological innovation and the shifting balance of global political and economic power means that the world is changing faster than ever. Trends such as globalization and the fourth industrial revolution promise to have an impact on society unlike any other time in history. More than ever, a business like SKF must operate from an "outside-in" perspective.

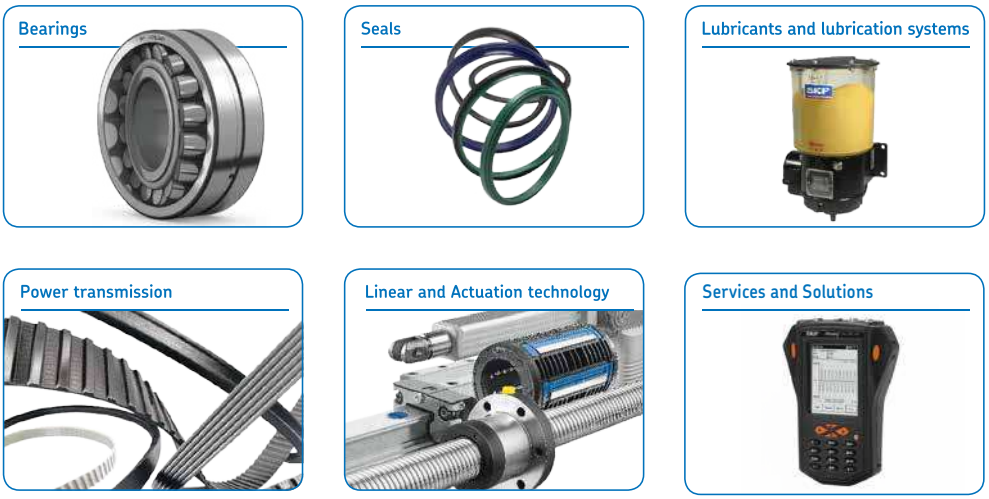
At the same time, economies need to grow in a fair way to meet the needs of society, and not at the expense of ethical business practice employee and human rights or the natural environment on which we all depend.

This complex and dynamic world presents big challenges and exciting opportunities for each and every one of the customers we serve.

Our experience, knowledge and people make us equipped to help customers to meet those challenges and take advantage of the opportunities. We have worked with customers in every industry and market worldwide for more than 100 years. That collective experience helps us combine a global and local approach with a deep understanding of cultures and regions as well as our customers' businesses and applications.

When we focus these resources on helping our customers thrive, we ensure customers have every incentive to continue choosing SKF again and again. We're going to be simpler, and more agile and adaptable than we've ever been – delivering quality bearing solutions and services targeted for more of today's customer needs from cost, performance and reliability perspectives.

This is how we help our customers to improve and thrive; this is how we make things better for SKF, our customers and society. When we win, grow and thrive with our customers, we know we have succeeded.



SKF Training Solutions overview

SKF Training Solutions portfolio

SKF Training Solutions offers training in a variety of formats covering topics in Maintenance & repair, Design & engineering, Condition monitoring and Asset Management.

- **E-learning**

  Introductory classes held online covering a variety of topics
- **Best practices classes**

  Introductory or refresher classes held at your facility
- **Private courses**

  Intermediate multi-day courses held at your facility
- **Public courses**

  Intermediate to advanced topics hosted at SKF facilities or other regional locations.

  These classes are associated with a certification program or SKF qualification testing.

SKF takes a blended learning approach to enhance intermediate and advanced learning experience. Our established classroom courses are complemented with a package of self study materials. These materials are accessed upon registration via the Knowledge Centre at www.skf.ca and may include: on-line learning modules, technical papers or application reports.

Benefits of training

- Achieve higher levels of personnel and machine efficiency
- Eliminate machinery problems
- Increase reliability and productivity
- Enhance plant safety
- Reduce unplanned downtime
- Under-utilization of equipment
- Develop skills of less experienced personnel to handle the departure of “expert” personnel
- Stop problems before they happen by addressing the root causes

Training needs analysis

Highest skills improvement opportunity for staff

If you don't know where to start, we can help. SKF has developed programs to assess the maintenance skills of your team and identify individual strengths and weaknesses. Together we then create a program that fits your needs and gives the best return on your investment in your people.

The SKF Client Needs Analysis – Training enables this crucial understanding, combining our experience in training and knowledge of maintenance and reliability. The goal is to provide useful and meaningful information to help you focus on improvements for plant performance.

These assessments are conducted with individuals or a group of your staff from the following work areas:

- Mechanical maintenance
- Reliability & Condition monitoring
- Engineering
- Planning & scheduling

Equip.

Encourage.

Empower.

Targeting eight critical areas of competency for improvement

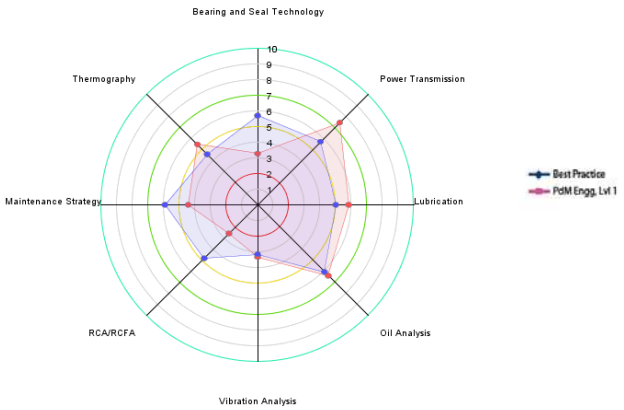
Opportunities for improvement are determined when the Client Needs Analysis – Training data is analysed. Typical improvements fall in the following areas:

- Bearing & seal technology
- Power transmission
- Lubrication
- Oil analysis
- Maintenance strategy
- RCA/RCFA
- Vibration analysis
- Thermography

Competency & skills gap analysis

The Client Needs Analysis – Training will give you a clearer perspective on your team's competency and skill level.

The results are analysed and presented highlighting opportunities for improvement as well as areas of exceptional performance.



Best practice classes

Hands on and accredited training to ensure best practices from your team!

These single day demonstration sessions are designed as introductory or refresher classes addressing important topics covering reliability of bearing systems and rotating equipment. Suitable for anyone working with, interested in or responsible for improving the reliability of rotating equipment.

Maximum group size per day is 10. Tuition is $2,500 per day.

Highly effective classes
Customized to your teams needs

BP101 Bearing fundamentals

- Bearing history, design and function
- Bearing lubrication basics
- Associated components
- Bearing fits
- Mechanical, hydraulic and thermal mounting techniques

BP102 Bearing lubrication basics

- Function of a lubricant
- Composition and definitions
- Grease lubrication
- Oil lubrication
- Maintenance & planning of lubrication

BP103 Bearing damage analysis

- Key factors affecting bearing performance
- Normal & abnormal load zones
- Identifying visual bearing damage characteristics
- ISO failure mode definitions

BP104 Shaft alignment basics

- Consequences of poor alignment
- Definitions & identification procedures
- Soft foot
- Rough and precision alignment methods
- Problem solving

BP105 Fundamentals of condition based monitoring

- Condition based monitoring
- Vibration basics
- Measurement techniques
- Spectrum analysis
- Establishing measurements & alarms

BP106 Fundamentals of thermography

- Introduction to basic infrared theory
- Testing considerations
- Technical application of thermography
- Limit standards review
- Interpreting results

Get the complete package

Bearing specialist program

Here's a package of training programs designed to develop you into a highly knowledgable bearing system maintenance specialist.

Step 4 – Advanced bearing system courses

- WE204 Root cause bearing failure analysis
- WE241 Precision maintenance skills
  Laser shaft alignment and rotor balancing

Step 3 – Bearing system maintenance classes

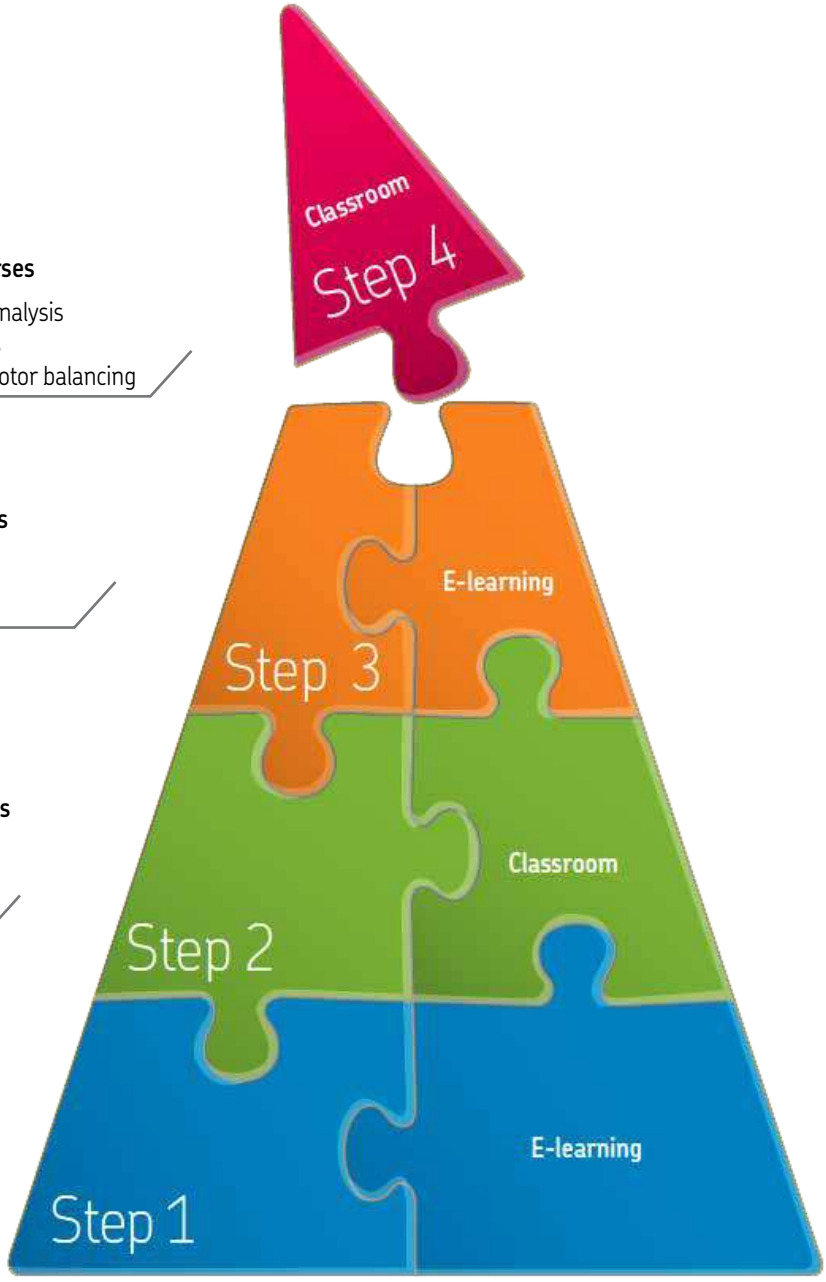
- WI130 Thermography basics
- WE150 Balancing basics

Step 2 – Intermediate bearing maintenance courses

- WE201 Bearing maintenance & technology
- WI241 Machine lubrication technician analyst - Level 1

Step 1 - Introduction to bearing system components

- GRB001 Bearing basics
- GRL001 Lubrication basics



Total Program Cost: $4,995 per person.

E-learning web-based training

Contact us to recieve your exclusive complimentary access

training.canada@skf.com

Learn at your own place and pace

The on-line area of SKF Training Solutions offers a wide range of e-learning courses. Self-paced learning can be accessed by the student at any time and place that best suits their learning needs.

Certificate

On completion of a course, the participant is offered an exam. Upon successful completion of the exam, the participant will receive an electronic certificate which can be printed out locally.

Structured learning path

These e-learning courses are an integral part of the SKF Training Solutions' comprehensive training portfolio. The courses are designed to complement the higher level classroom courses that are delivered by our specialist training staff.

SKF Training Solutions e-learning can be found at
www.skf.com/ca/en/knowledge-centre

To arrange a subscription, simply follow the link on the home page. If you have logged in and have a subscription to the selected material, then you will see a link to SKF Training Solutions on-line service pages on the course summary.

When you click the "start service" link, a new window will open, presenting you with the SKF Training Solutions home page. The SKF Training Solutions on-line service is currently available in English. Additional languages are in development.

Basic system requirements

SKF Training Solutions e-learning is powered by a market leading learning content management system. This allows fast and efficient delivery of sophisticated training materials to make your learning experience more interesting, enjoyable and effective. All that is required is a subscription and a computer with an internet connection.

Maintenance strategy courses

MS 100 AEO basics
MS 101 Assessment basics
MS 113 Proactive reliability maintenance
MS 120 Operator driven reliability
MS 130 Maintenance strategy review

Work identification courses

WI 100 Vibration basics
WI 130 Thermography basics
WI 140 Lubrication analysis basics

Work control course

WC 130 Spare parts management

Work execution courses

WE 104 Bearing damage analysis
WE 150 Balancing basics

General reference courses

GRB 001 Bearing basics
GRB 002 Spherical roller bearings
GRB 003 Angular contact ball bearings
GRB 004 CARB® toroidal roller bearings
GRB 005 Tapered roller bearings
GRB 006 Deep groove ball bearings
GRL 001 Lubrication basics

Product course

PT01 MCA SKF Machine condition advisor

SKF Life Cycle Management

Industrial operations everywhere understand that effective management of assets throughout their lifecycle can deliver significant value and reduce total cost of ownership. No single company is better prepared to help you achieve this than SKF.

SKF - at the heart of OEM assets

SKF has been at the heart of machinery since 1907. Our history of providing bearings, seals, lubrication, linear motion, actuation and mechatronics solutions for OEMs in every major industry gives us a unique depth and breadth of knowledge of industrial assets. From specification, design and development, to manufacturing and testing, SKF has worked with OEMs to solve application challenges and deliver world-class solutions globally.

Supporting assets in the aftermarket

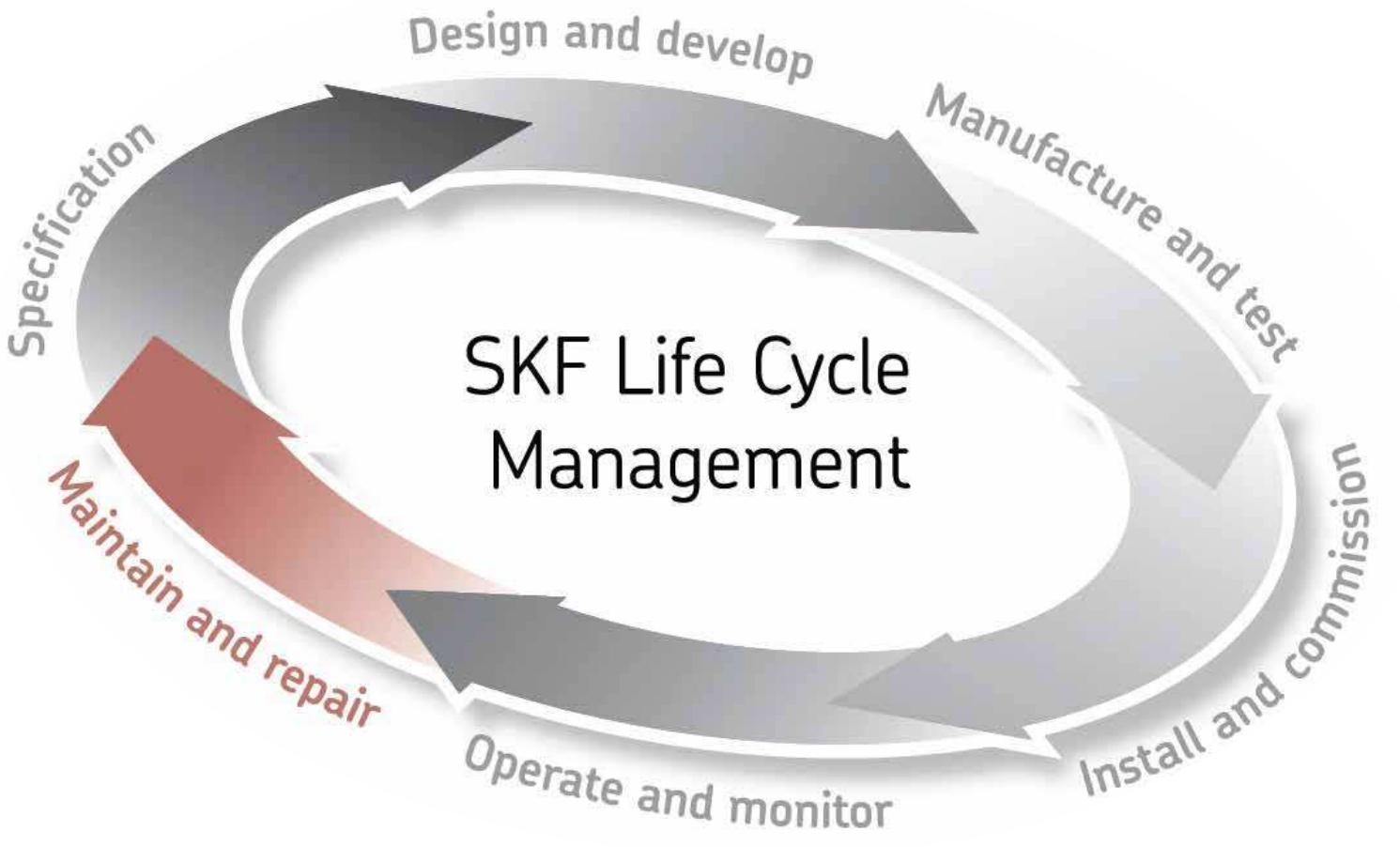
Building on this knowledge, SKF has developed advanced services and technologies to maintain, monitor, repair and optimise your assets throughout their operating life. Providing the optimum replacement parts at the right time which helps our customers to optimize their asset efficiency.

Closing the asset life cycle loop

We close the SKF Life Cycle Management loop when we channel our 'end user' knowledge back into the specification phase of next generation equipment. Technologies, such as condition monitoring, can be designed into new OEM assets or retrofitted, constantly improving and providing differentiation in competitive markets, adding value, and extending the possibilities for aftermarket services and enhanced machinery maintenance.

Delivering benefits to our customers

At every stage of the asset life cycle, SKF products, advanced services and solutions help our customers improve productivity, reduce maintenance costs, improve energy and resource efficiency, and optimize designs for long service life and reliability. Ultimately this helps to make them more successful, sustainable, and profitable.



Maintain and repair

Supporting machinery maintenance and operations with a range of tools and service

We offer training in the latest precision maintenance and condition monitoring practices.

SKF specialists can even supplement your workforce with expert, hands-on services.

SKF remanufacturing services can restore bearings, housings and gearboxes to full working specifications, avoiding costly replacement.

Our spare parts optimization and management services can help provide for the availability of replacement parts while minimizing the cost of stock.

Our offers include:

- Maintenance and alignment tools and services
- Electric motor testing and certified repair shops
- Spindle reconditioning
- Remanufacturing services
- Root cause failure analysis
- Spare parts optimization and management
- On-line and on-site training
- Global supply of replacement bearings, housings, seals and lubricants

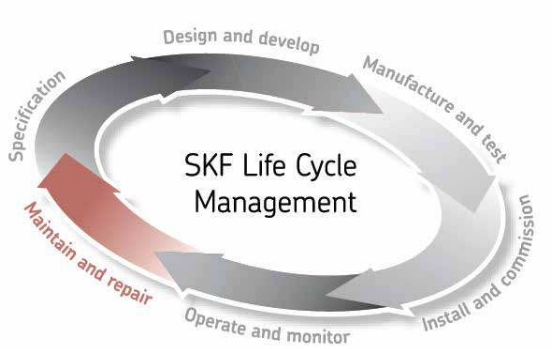
WE201 - Bearing maintenance and technology

Recommended for

Millwrights, mechanics, service technicians, engineering technicians, maintenance or repair personnel working with rotating equipment.

Course objective

The course will teach the attendee to improve the service life of rolling bearings and thereby reliability of rotating machinery. Focus is on fundamental bearing technology, importance of proper handling, appropriate methods of mounting and dismounting as well as bearing system maintenance and care. This is done through a combination of hands-on training, audio-visuals, lectures and discussion opportunities.



Public course:
2 days, $995 per participant
Private course:
2 days, $6,995 for 10 people

SMRP APPROVED PROVIDER

Specific topics include

Bearing basics

- Types
- Components
- Terminology
- Designation system
- Materials
- Quality
- Housings and associated components

Bearing maintenance

- Review of maintenance styles
- Selection of shaft and housing fits
- Proper bearing mounting and dismounting tools and techniques (mechanical, thermal and hydraulic)
- Bearing system assembly and installation
- Maintenance mistakes
- Laser shaft alignment basics

Factors affecting bearing performance

- Bearing loads
- Bearing capacities
- Design life versus service life
- Seal designs
- Environmental considerations

Fundamentals of bearing lubrication

- Primary function of a lubricant
- How bearing lubrication works
- Grease lubrication
- Oil lubrication
- Relubrication practices

Public course 2018 schedule

Winnipeg	February 14-15	Montreal	May 23-24 (F)	Toronto	October 10-11
Kingston	February 27-28	Sarnia	June 19-20	Calgary	November 19-20
Vancouver	March 12-13	Regina	August 20-21	Edmonton	November 21-22
Calgary	April 10-11	Toronto	September 12-13		
Edmonton	April 12-13	Kingston	September 24-25		

WC200 - Maintenance planning and scheduling

Recommended for

All planners and maintenance staff involved in planning and scheduling.

Course objective

With this course, students will learn how to leverage labor resources (increase efficiency and productivity with fewer resources), how to reduce reactive maintenance and how to minimize efficiency losses resulting from disconnects with the productions schedule, priority changes, emergency work, and outages. An effective planning and scheduling system will enable your maintenance personnel to increase productivity.

Private course: please inquire

Specific topics include

Planning fundamentals and principles

- Theory
- Process
- Standard work
- Planning and reserving material

Scheduling fundamentals and principles

- Theory
- Process
- Handling backlog
- Scheduling effective meetings

Work closeout

- Follow up and key performance indicators
- Continuous improvement projects

Schedule compliance and metrics

- Wrench time
- Error notification

Shutdown process

Work administration tools

Private course available

- Please inquire | training.canada@skf.com

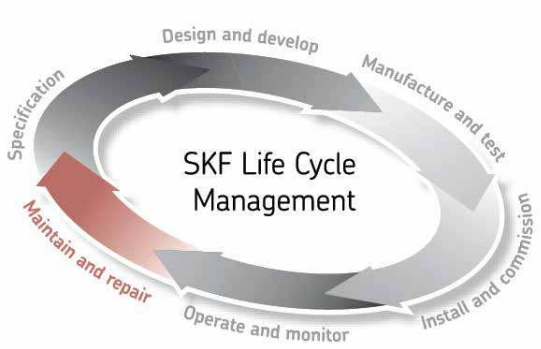
WE202 - Reliability in rotating equipment

Recommended for

Reliability and maintenance personnel responsible for the successful installation, operation, maintenance and monitoring of existing rotating equipment.

Course objective

The course focuses on the four most common types of rotating equipment: pumps, motors, fans and gearboxes. The students learn world class techniques for installation, maintenance, troubleshooting and repair that can be translated to all types of rotating equipment.



Private course: please inquire

Specific topics include

Industrial pumps

- Bearing system design overview
- Pump operation and terminology
- Controlling thrust loads
- ANSI versus API design standards
- Troubleshooting

Industrial motors

- Bearing system design overview
- Factors affecting bearing performance
- Installation
- Troubleshooting
- Condition monitoring

Industrial gearboxes

- Bearing system design overview
- Coupling machinery: alignment overview
- Proper oil lubrication
- Monitoring and inspection

Industrial fans

- Bearing system design overview
- Fan performance
- Installation of pillow block mounted bearings
- Lubrication and relubrication of open bearings
- Detecting and correcting imbalance

Private course available

- Please inquire | training.canada@skf.com

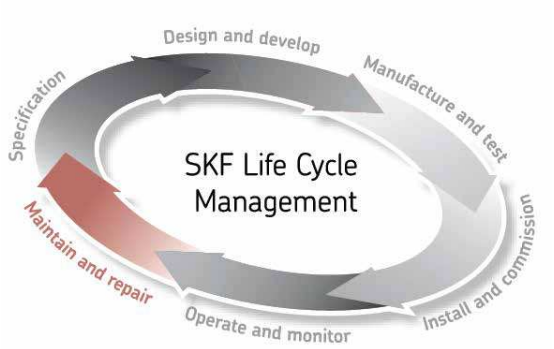
WE203 - Lubrication of Rolling Element Bearings

Recommended for

Maintenance personnel and engineers responsible for bearing lubrication, lubricant specification and lubrication system planning and design.

Course objective

Upon completion, students will be able to evaluate and select appropriate lubricants for a wide variety of rolling element bearing applications.



SMRP APPROVED PROVIDER

Private course: 1 day
10 people, $3795/day

Specific topics include

Lubrication fundamentals

- Functions of lubrication
- Basic expressions
- Lubricant additives and their effects

Grease lubrication

- Grease functions and properties
- Grease delivery and metering systems
- Selection of grease type: choosing the right grade, base, stiffness, and oil for your application
- Compute grease intervals and relubrication amounts

Oil lubrication

- Choosing the right lubricant: oil and grease quality standards and testing
- Effects of cleanliness and contamination
- Using the new life theory to predict the effects of contamination on bearings
- Effects of water ingress
- Effective use of filtration and choosing the right filter
- Change-out intervals
- Bearing housing design concepts
- Comparison of oil delivery methods
- Determining oil flow rates

Applying lubricants

- Determining lubrication quantities and intervals
- Hands-on lubrication and relubrication procedures for pillow blocks, ball bearings, roller bearings, sealed and shielded bearings
- Electric motor relubrication

Common errors/troubleshooting

- Over-greasing, under-greasing, and mixing greases
- Corrective actions

Public course 2018 schedule

Calgary	October 22
Edmonton	October 24

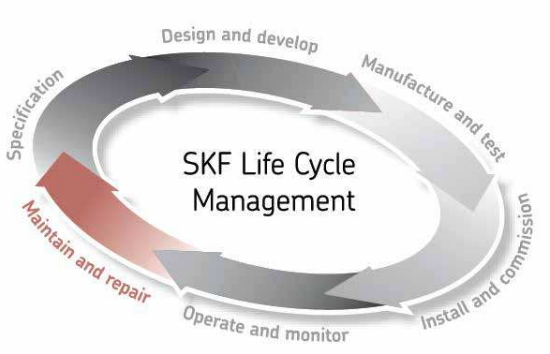
WE241 - Precision maintenance skills
Laser shaft alignment and rotor balancing

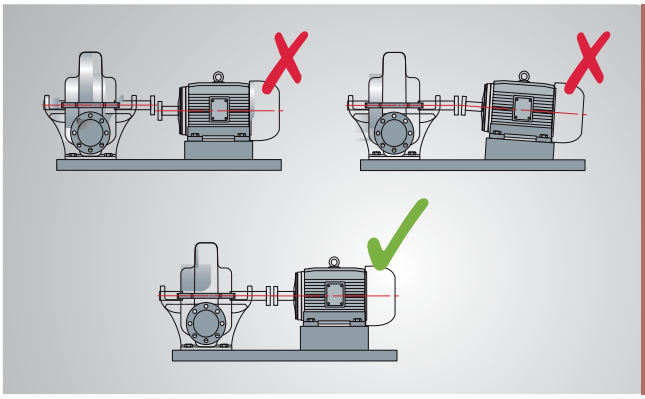
Recommended for

Maintenance personnel responsible for machine installations and troubleshooting.

Course objective

This hands-on course aims to teach maintenance personnel the fundamentals of laser shaft alignment techniques and rotor balancing techniques and given the time to practice these skills under the guidance of a SKF Service Engineer.





Private course: please inquire

Specific topics include

Proactive shaft alignment

- Machinery alignment and misalignment
- Alignment tolerances
- Soft foot
- Laser alignment techniques

Hands-on workshop rotor balancing

Understanding imbalance

- Identifying imbalance
- Single plane (static) balancing
- Single plane (dynamic) balancing

Hands-on workshop

Private course available

- Please inquire | training.canada@skf.com

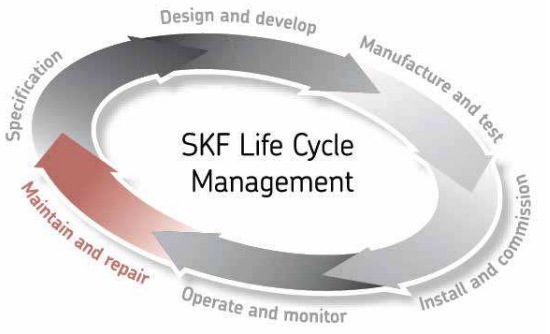
WE242 - Precision maintenance skills
Rotor components and power transmission

Recommended for

Maintenance personnel responsible for machinery installations and troubleshooting.

Course objective

This advanced course aims to teach the maintenance personnel an understanding of the precision and proactive practices necessary to install and maintain a machine to the highest possible level.



Private course: 2 days,
$6,995 for 10 people

Specific topics include

Machinery mechanical troubleshooting

- Machine history
- Maintenance history
- Machine details
- Disassembly
- Identifying resonance

Achieving precision in belt driven machinery

- V-belts
- Sheaves
- Sprockets
- Installation and troubleshooting
- Belt tensioning

Proactive shaft alignment

- Machinery alignment and misalignment
- Alignment tolerances
- Soft foot
- Alignment methods
- Proactive steps

Seal reliability

- Mechanical seals
- Pressure balance
- Troubleshooting
- Precision seal installation

Graphing techniques

- Fundamentals
- Thermal growth

Rotor balance and precision assembly

- Understanding imbalance
- Improving rotor balance through precision assembly
- Techniques to make any machine run more smoothly

Private course available

- Please inquire | training.canada@skf.com

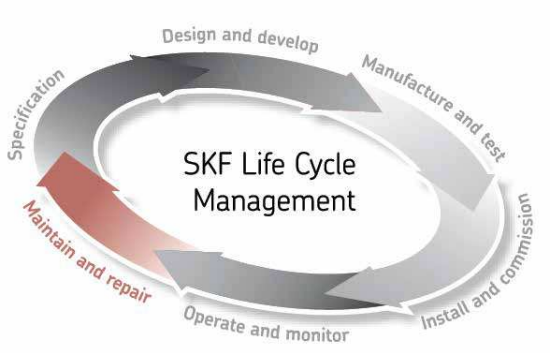
WE250 - Dynamic field balancing

Recommended for

Condition monitoring and maintenance personnel seeking strong practical skills in balancing rotating equipment to precision level in the field and in the shop.

Course objective

This courses teaches proper diagnosis of imbalance, assessment of balancing requirements/methods, data acquisition and balancing procedures.



Private course: 2 days,
$6,995 for 10 people

Specific topics include

Vibration analysis – the first step in field balancing

- Confirming imbalance
- Other "look alike" problems
- Trial weights and rotor response

Single plane (static balancing)

- Vector diagrams
- Balancing without phase
- Instrument solutions

Two plane (dynamic) balancing

- Splitting weights
- Cross effect
- Two plane solutions

Static and couple balancing

- When to use
- Techniques

Balancing machines

- Hard bearing versus soft bearing
- Troubleshooting
- Balancing tolerances
- Traverse test

Hands-on

- Day 2 is devoted to hands-on skill practices using training kits and existing machinery

Private course available

- Please inquire | training.canada@skf.com

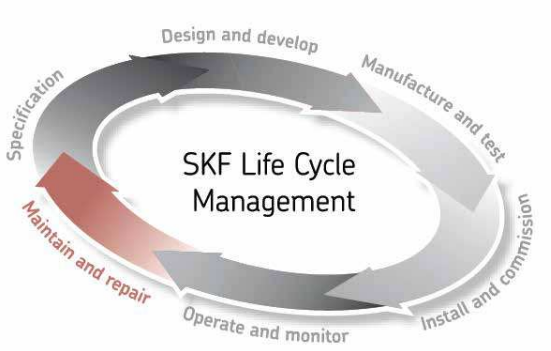
WC230 - Spare parts management & inventory control

Recommended for

Plant personnel involved with industrial maintenance inventory control, planning, scheduling and purchasing.

Course objective

This course provides participants with a sound knowledge and understanding of spares and inventory management in the maintenance, repair and operations environment.



Public course: 2 days, $995 per participant

Correspondance course: please inquire

Specific topics include

Spare parts and inventory management processes and principles

- Terminology
- Relationship to business goals

Identifying, structuring and classifying criticality

- Order and reorder parameters
- Optimizing availability
- Handling obsolete parts

Spare parts management

Maintenance and spare parts strategy

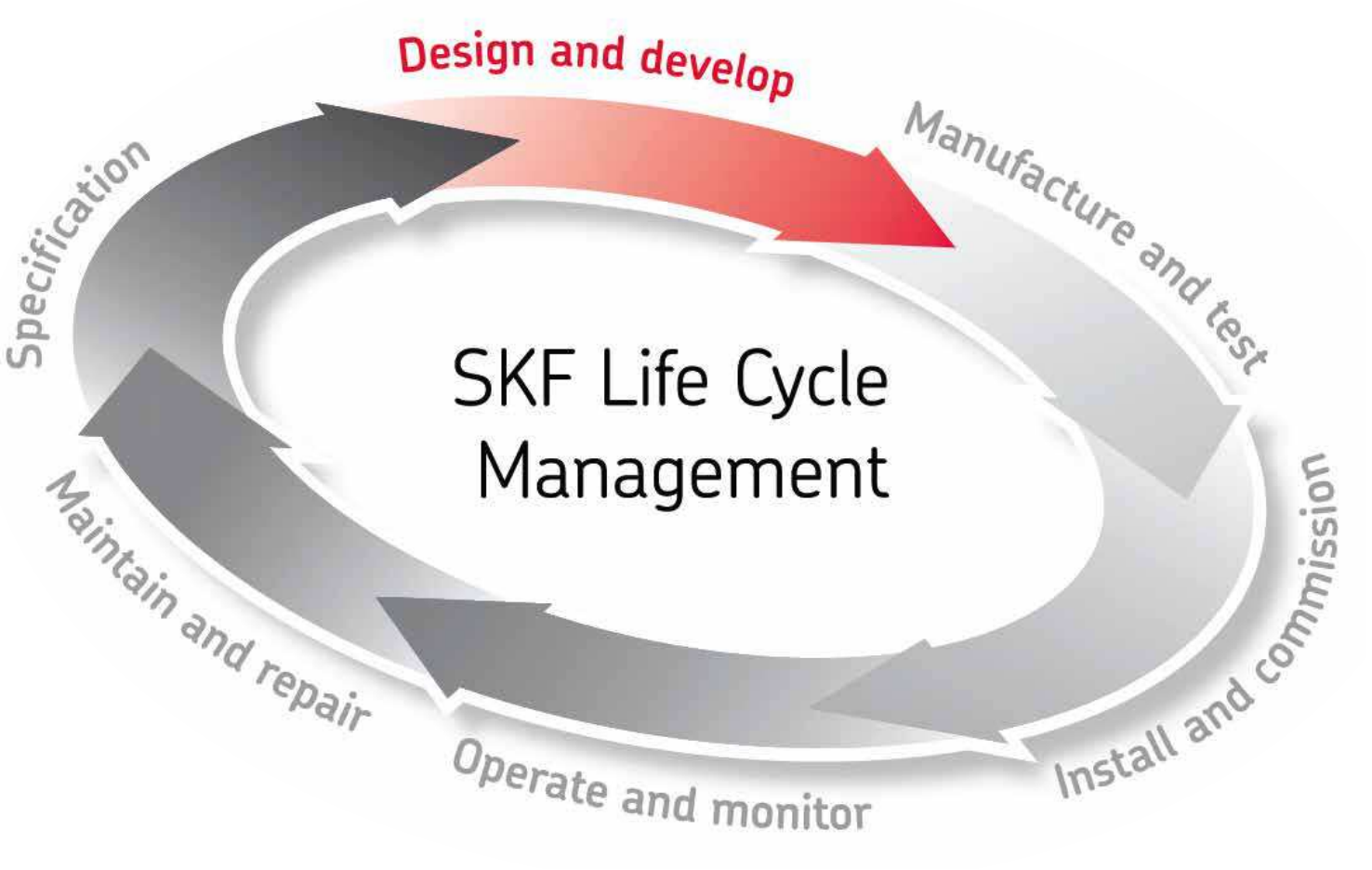
MRO inventory management

- Basics
- Work processes
- CMMS

Case studies

Public course 2018 schedule

- Calgary March 6-7



Design and develop

Solving application challenges with a systems approach to designs

Our proprietary 3-D modelling software simulates the interaction of machine components. Customers can explore alternate materials and geometries to optimize and verify designs virtually, before actual prototyping.

We can help you choose the right products and solutions to extend operating life, reduce maintenance needs, improve energy efficiency, reduce Total Cost of Ownership, and more. We can also help you in designing sensors to monitor position, load, temperature and vibration.

When it's time to redesign, we can apply a range of knowledge about how that machinery was operated, maintained, repaired and improved over the course of its service life.

Our offers include:

- Application engineering and validation
- Design for Six Sigma
- Custom instrumentation design
- Project management
- Life cycle costing
- Testing
- System failure analysis

WE204 - Root cause bearing failure analysis

Recommended for

Reliability and maintenance personnel responsible for optimizing the performance and improving the reliability of existing rotating equipment.

Course objective

The course provides background information and methodologies for analysing damaged or failed bearings and their associated compontens. Students will learn to uncover the true root causes of reduced bearing life.

Public course: 2 days, $1,195 per participant

Private course: please inquire

SMRP APPROVED PROVIDER

Specific topics include

Bearing fundamentals

- Terminology
- Design and function
- Lubrication
- Design of associated components

Key factors affecting bearing performance

- Bearing loads
- Clearance
- Speed & vibration

Bearing performance

- Normal and abnormal load zones
- Bearing failure progression
- Temperature effects

Root Cause Analysis

- Investigation methodologies
- Service expectations versus service realities
- Primary, secondary and tertiary damage levels
- Case studies and workshops

Visual damage characteristics

- ISO failure mode definitions
- Mechanisms of failure

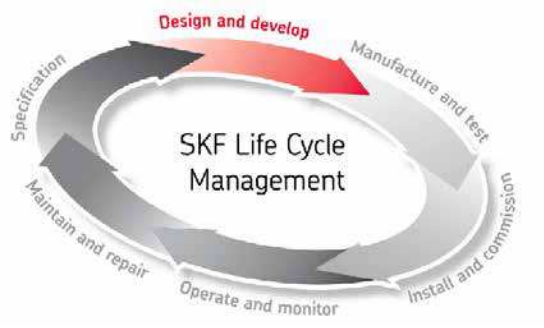
Public course 2018 schedule

Toronto	February 12-13
Montreal	February 21-22 (F)
Quebec City	April 9-10 (F)
Winnipeg	April 17-18
Vancouver	May 1-2
Edmonton	May 15-16
Val D'Or	July 3-4 (F)
Gatineau	September 18-19 (F)
Calgary	November 1-2
Toronto	November 27-28
Edmonton	December 4-5

BSD301 - Bearing system design

Recommended for

Design engineers directly responsible for rolling element bearing system design. Reliability and maintenance engineers responsible for optimizing the performance and improving the reliability of existing machinery.

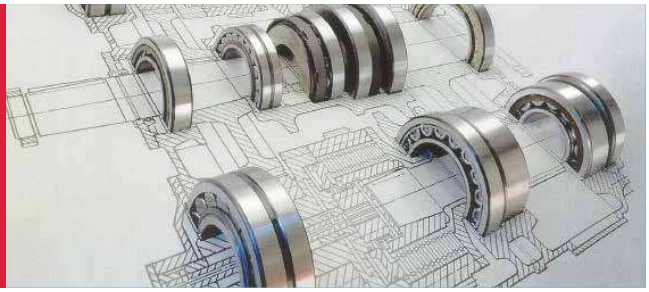


Course objective

Students will gain a thorough understanding of bearing system designs used in typical industrial applications. Includes bearing life, lubrication life, seal life and other factors affecting performance and reliability of rotating equipment. This course uses a combination of lectures, open discussions and guided exercises.

Public course: 3 days, $1,395 per participant

Private course: please inquire



Specific topics include

Selection of bearing type

- Available space
- Loads
- Misalignment
- Precision
- Speed
- Stiffness
- Axial displacement
- Mounting & dismounting
- Integral seals

Lubrication of bearings

- Grease lubrication
- Relubrication
- Oil lubrication

Selection of bearing size

- Bearing reliability – system life
- Dynamic load ratings and life
- Dynamic and static bearing loads
- Static load ratings and capacity

Calculation tools

Friction, speed and vibration

- Friction models
- Reference speeds
- Limiting speeds
- Influence of vibration

Bearing data

- Dimensions
- Tolerances
- Internal clearance
- Materials
- Cages
- Designations

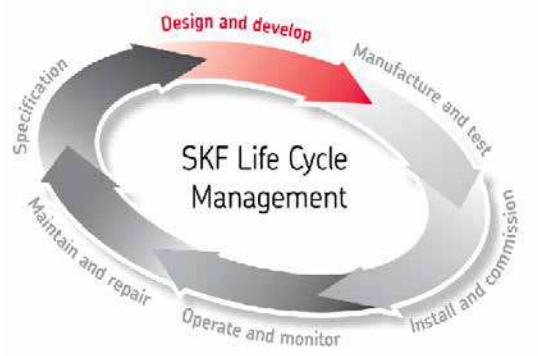
Application of bearings

- Bearing arrangements
- Radial location of bearings
- Axial location of bearings
- Designing associated components
- Bearing preload
- Sealing arrangements

Public course 2018 schedule

■ Toronto	May 29-31	■ Toronto	October 16-18

RCA302 - Root cause analysis



Recommended for

Reliability engineers and technologists.

Course objective

This course will showcase how to identify the predominant root cause to critical failures, creating and executing cost effective solutions as well as tracking the results.

Private course: please inquire

Specific topics include

Root cause failure analysis theory

- What, when and why to do an RCA
- Life cycle of failure management
- Failure modes

RCFA team

- Facilitator
- Sponsor
- Supporting team members

RCFA in practice

- Needs determination
- Incident response
- Preservation of evidence
- Failure analysis and root cause verification
  - Event sequencing
  - Building a Why Tree
  - Fishbone diagrams

RCFA processes

- Defining the problem
  - One time versus chronic failures
- FMECA
- Cause and effect
- 5 why's
- The Why Tree

Private course available

- Please inquire | training.canada@skf.com

AMS101 - Maintenance & Reliability Best Practices

Recommended for

Maintenance Managers, Maintenance Superintendents, Maintenance Engineers, Maintenance Planners, Reliability Group (Engineer, Specialists, Consultants), Plant Managers, Engineering Managers, Manufacturing Managers, Production Managers, Operations Managers, Asset Managers

Course objective

Understand maintenance and reliability performance metrics and their importance in improving and sustaining effective maintenance strategies.

Public course: $1,395/ participant

Private course: $6,995 for upto 10 participants

Exam fee: $600/participant

SMRP APPROVED PROVIDER

Specific topics include

Module 0: Understanding Maintenance, Reliability and Asset Management

Module 1: Organizational Business Requirements

This subject includes skills used to translate an organization's business goals into appropriate maintenance and reliability goals that support and contribute to the organization's business results.

Module 2: Process Reliability Concepts

This section includes maintenance and reliability activities to the manufacturing process of the organization to ensure that maintenance and reliability activities improve the manufacturing process.

Module 3: Equipment Effectiveness

This module includes two kinds of activities that apply to the equipment and processes for which a maintenance and reliability professional is accountable. First are those activities used to assess the current capabilities of the equipment and processes in terms of their reliability, availability, maintainability, and criticality.

Module 4: Organization and Leadership of Maintenance & Reliability Resources

This subject area includes processes for assuring that the maintenance and reliability staff is the most qualified and best assigned to achieve the maintenance and reliability organization goals.

Module 5: Establish Maintenance & Reliability Culture

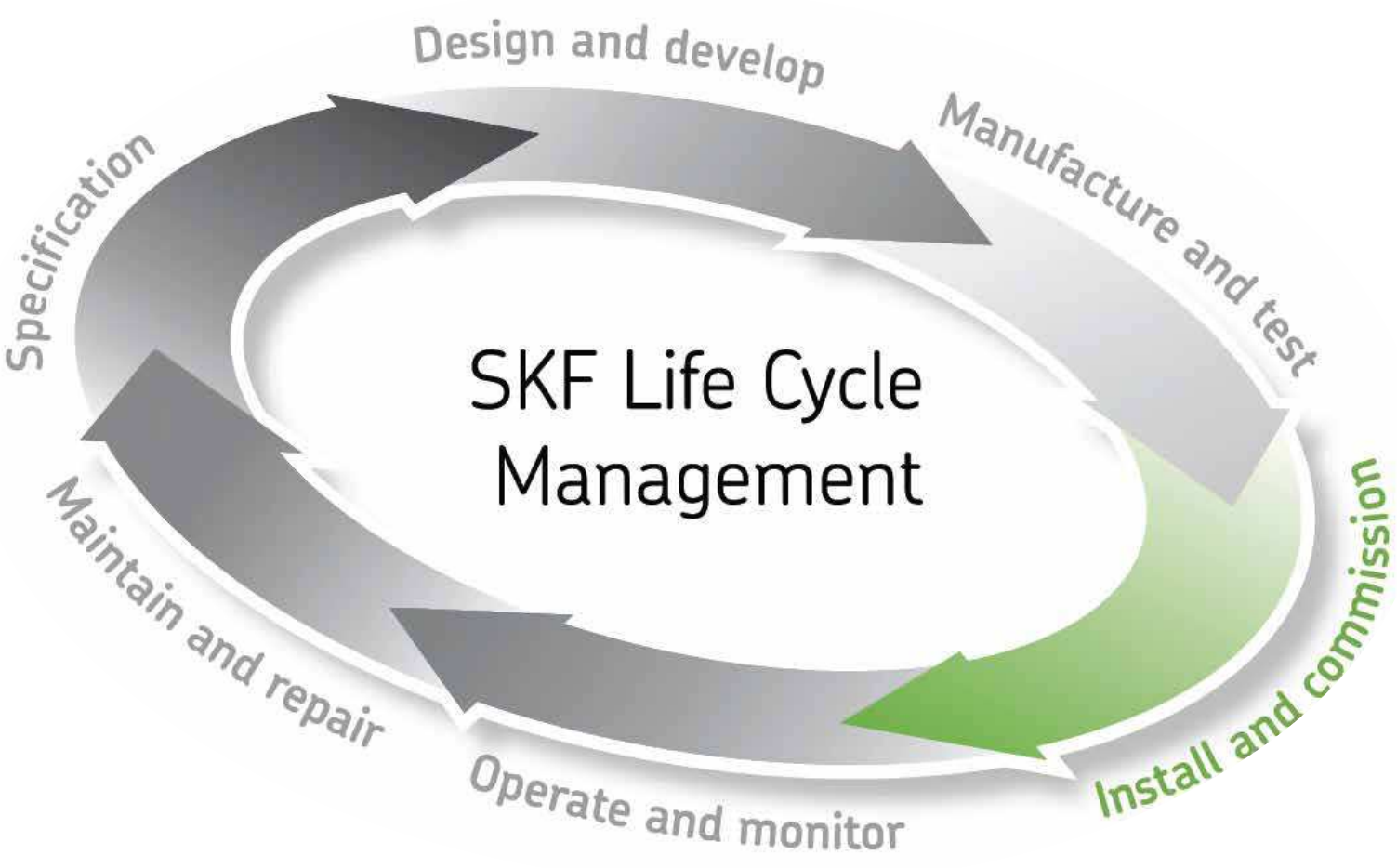
This module focuses on the skills used to get the maintenance and reliability work done. It includes planning and scheduling activities, quality assurance of maintenance activities, stores and inventory management.

Module 6: CMRP Exam (if applicable)

Contact training solutions to register for the exam online

Public course 2018 schedule

- Calgary March 26-29
- Vancouver May 15-18
- Regina June 19-22
- Edmonton August 13-16
- Toronto August 27-30



Install and commission

Providing expert on-site services, training and auditable procedures

Improper installation can reduce machine service life, affect product quality and drive up maintenance costs. SKF Life Cycle Management features a range of expert services, training and products to provide timely, accurate commissioning of new and replacement machinery.

Along with assisting proper mechanical setup for optimal operation, SKF can validate machine condition after installation using check-to-conformance technology. For equipment manufacturers, this validation provides a valuable record of machine operation at the point of commission. Operators can also reference this baseline throughout the service life of the machine.

Our offers include:

- Bearing mounting
- Machine installation
- Precision alignment and balancing
- Lubrication management
- Check to conformance
- Factory acceptance testing
- On-line and on-site training
- Start-up monitoring

SS101 - SmartStart – Product start up training

Need help with your newly purchased SKF equipment?

SmartStart is an on-site product start up training service that focuses on a specific product or system. It is designed to get that product up and running, your employees trained and your program implemented quickly and effectively.

This training is intended to be one-on-one or small groups to maximize the time of the students with the instructor. Since it is held at your facility, your tools and equipment are used for field exercises. This mentoring approach allows the instructor to offer insightful, pragmatic information that will provide your team with powerful tools for SKF Maintenance and Condition Monitoring Products.

Maximum group size per day is 5.
Tuition is $1,500 per day.

Available for the following products:

WICM255 - SKF Microlog Analyzers
WICM270 - SKF on-line systems
WICM271 - SKF Copperhead systems
WICM272 - SKF Imx on-line system

WE235 - SKF TKTI Thermal imaging systems
WE245 - SKF TKSA Laser shaft alignment systems
WE255 - SKF PHL Belt frequency meter
WE265 - SKF Belt Alignment systems

SM101 - SiteMentor – Advanced product training

Want to go even further with your SKF equipment? SiteMentor is an advanced instructional series specific to a variety of SKF Condition Monitoring equipment. This training is intended to help your continuous improvement and reliability projects through skill advancement of your maintenance and/or reliability group.

Available for the following products

WICM255a	SKF Microlog Analyzers and SKF @ptitude Analyst
WICM270a	SKF on-line systems
WICM350a	Advanced SKF Microlog @ptitude Analyst applications

Plan ahead! Allow your team to get comfortable with their tools for a few months; book advanced training for them at a reduced rate (6 months lead time required).

Course duration: 2 days

Tuition is $6,995 for 10 people

WICM233 - SKF Microlog Inspector

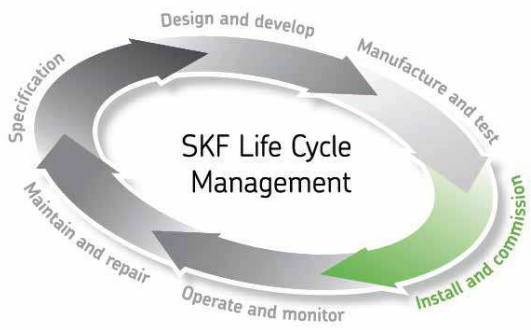
Recommended for

Plant personnel using the SKF Microlog Inspector System.

Course objective

This course thoroughly covers the features and fault detection capabilities of the SKF @ptitude Inspector device including database management, data display and data reporting features.

The course is conducted in a one-on-one or small groups format to maximize the individual learning experience. Hosted at your facility on your equipment allowing for complete personalization of the time.



Private course: 2 days, $6,995 for 10 people

Specific topics include

- Review setup and utilization of the Wireless Machine Condition Detector
- Review installation and use of quick connect studs
- Review selection of measurement locations
- Building a database
- Transfering data between SKF @ptitude Inspector and the Microlog Inspector
- Display and generate trends and reports in SKF @ptitude Inspector
- Hardware and software platforms

Private course available

- Please inquire | training.canada@skf.com

WICM255 - SKF Microlog Analyzers

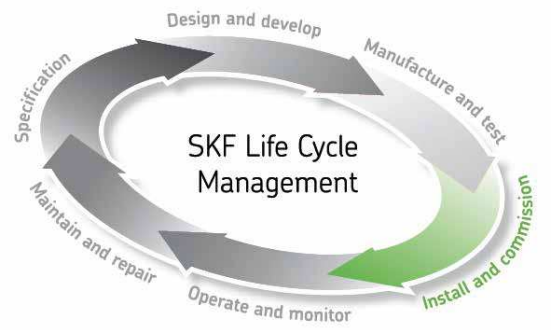
Recommended for

Plant personnel using any of the SKF Microlog analyzers.

Course objective

This course thoroughly covers the features and fault detection capabilities of any of the SKF Microlog devices including database management, data display and data reporting features.

The course is conducted in a one-on-one or small groups format to maximize the individual learning experience. Hosted at your facility on your equipment allowing for complete personalization of the time.



Private course: 2 days, $6,995 for 10 people

Specific topics include

Condition monitoring basics

- Condition based maintenance program overview
- Guideline for implementing a portable condition monitoring program
- Advantages of various vibration signal processing techniques
- Techniques to isolate and detect specific machinery faults

SKF specific training

- Set up default properties on the SKF @ptitude Analyst software
- Navigating the software
- Creating databases
- Download and upload measurements
- Setting up default properties in the SKF Microlog
- Collecting route and off route measurements
- Generate graphic plots and reports

Advanced analyzer application modules

- Multi channel measurements
- FRF measurements
- Balancing

Private course available

- Please inquire | training.canada@skf.com

WICM270 - SKF On-line systems

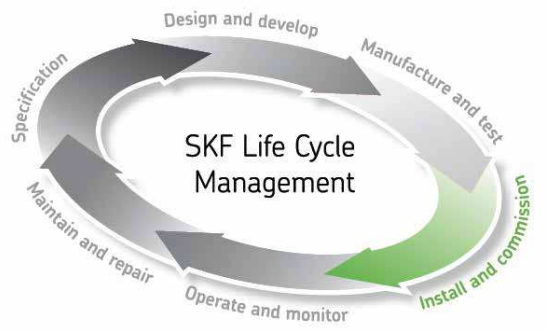
Recommended for

Plant personnel using SKF on-line monitoring systems.

Course objective

This course provides a detailed explanation of the operation of the SKF Microlog Consultant system and provides start up assistance on associated support software.

The course is conducted in a one-on-one or small groups format to maximize the individual learning experience. Hosted at your facility on your equipment allowing for complete personalization of the time.



Private course: 2 days, $6,995 for 10 people

Specific topics include

SKF @ptitude Analyst On-line System concept

- Product structure
- Applications

Hardware and software installation and requirements

- Software installation and setup
- System checkout
- Windows system setting and installation options
- Installing SKF @ptitude Analyst and the CMU/TMU/MIM driver
- Troubleshooting
- CMU/TMU operation and theory

Database configuration

Application and best practices

Parametric gating and control points

On-line data collection process

Measurement process and Heartbeat concept

DAD communication and live data collection process

Reporting

- Displaying on-line data plots
- Generating and printing data reports

Private course available

- Please inquire | training.canada@skf.com

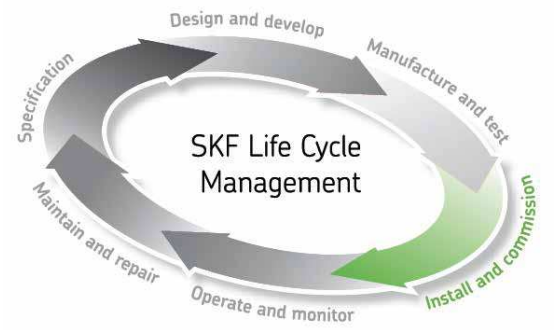
WICM350 - Advanced SKF Microlog and @ptitude Analyst applications

Recommended for

Any user of the SKF Condition Monitoring @ptitude Anlayst software and Microlog data collector requiring proficiency in the setup and use of the equipment.

Course objective

This course aims to advance the users' skill level in operating the SKF hardware and software for accurate condition detection, efficient program operation and root cause failure analysis.



Public course: 3 days, $1,395

Specific topics include

Microlog modules

- Bump test
- Run up/coast down
- FRF module
- Recorder module
- Balancing module
- ARM software

Phase collection and analysis

- Phase with a tachometer for route and non-route collection
- Cross channel phase for machine investigations
- Phase from FRF transmissibility data
- The use of strobe lights for phase analysis and machinery troubleshooting

Time waveform analysis

- Microlog and Analyst setting based on rotor rotation and fault frequency content
- Impulses/impacting and fault frequency identification
- Synchronous time averaging to isolate machinery from other external vibrations

Bearing fault detection and anlaysis

- Acceleration enveloping
- HFD readings
- Ultrasonic technologies
- Spectrum and time waveform fault identification

@ptitude Analyst optimization

- Filters, workspaces and editing for improvement
- Improved measurement parameters
- Taking full advantages of hierarchies, sharing and storing data

Effective condition monitoring alarms

- Overall alarms – manual and statistical
- Spectrum alarming techniques
- Using derived points

Report generation

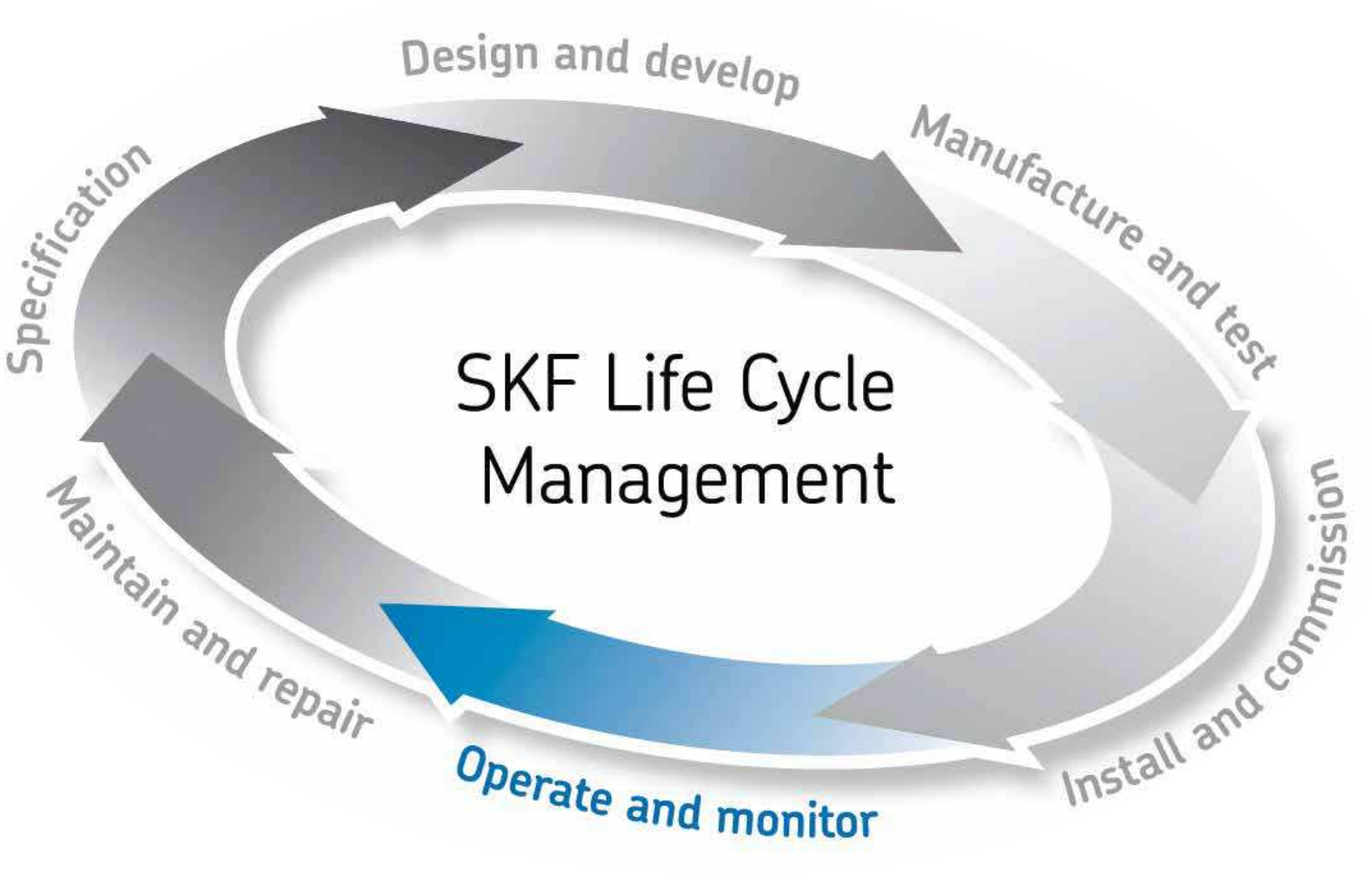
- Creating and scheduling reports
- Importing reports into MS Office

Microlog setup

- Route and non-route configurations
- Memory and setup considerations
- Cable and transducer configurations

Public course 2018 schedule

- Toronto June 5-7



Operate and monitor

Deploying the right solutions at the right time to improve productivity

By collecting and analyzing the right operating data, SKF can help you identify the need for machinery maintenance activities. Using a proven methodology we call Asset Efficiency Optimization (AEO), we help you identify and implement the right maintenance approach for you: reactive, preventative, predictive, or proactive. AEO combines a range of strategic and tactical tools to help you answer these questions to achieve maximum effectiveness and reduce your Total Cost of Ownership.

Our offers include:

- Asset Efficiency Optimization
- SKF @ptitude suite
- Operator driven reliability
- Remote monitoring and diagnosis
- Predictive maintenance

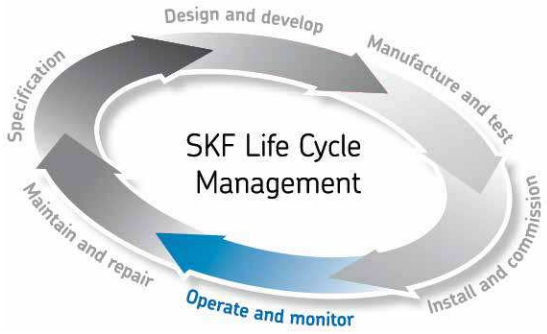
WI202 - Vibration analysis level 1 - data collection

Recommended for

Condition monitoring and maintenance personnel seeking a general understanding of condition monitoring techniques, equipment and best practices in data collection.

Course objective

The participant will learn how to select and locate appropriate sensors and how to isolate machinery. As well, participants will understand how to recognize various common problems and make recommendations for continued operation or scheduled repairs.



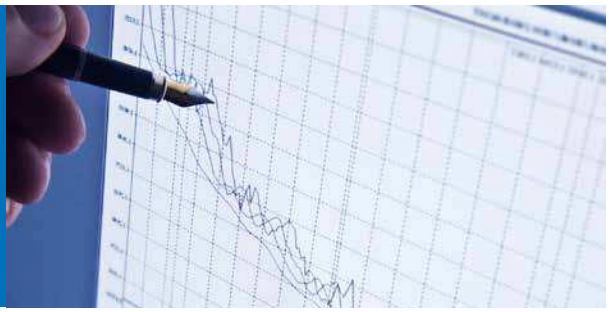
SMRP APPROVED PROVIDER

Public course: 4 days, $1,395 per participant

Optional CMVA certification exam on day 5
Exam fee - $325 per person

CVMA membership fee additional

Private course: please inquire



Specific topics include

Principles of vibration

- Definitions, relationships, relate real-world events to conventional patterns, calculations

Data acquisition

- Safety
- Instruments
- Sensors
- Sensor mounting
- Data collection techniques
- Computer interaction
- Data quality

Signal processing

- FFT representation
- Frequency identification

Condition monitoring

- Trending
- Comparisons
- Exception report

Fault analysis

- Imbalance, misalignment
- Mechanical looseness, soft foot
- Journal and rolling bearing defects

Corrective action

- Safety issues
- Process
- Machine mounting problems
- Further investigations

Acceptance testing

- Test procedures
- Recording results

Hands-on practice

Exam preparation

The CMVA Training and Certification Committee believes that accurate, consistent data collection is absolutely essential to worthwhile route-based condition monitoring programs. CMVA membership is required to write exam.

SKF is an authorized evaluator for the candidates data collection practicum.

Public course 2018 schedule

- Toronto March 5-8
- Montreal March 19-22 (F)
- Edmonton April 23-26
- Regina May 7-10
- Vancouver June 25-28
- Calgary August 13-16
- Calgary December 3-6
- Toronto December 10-13

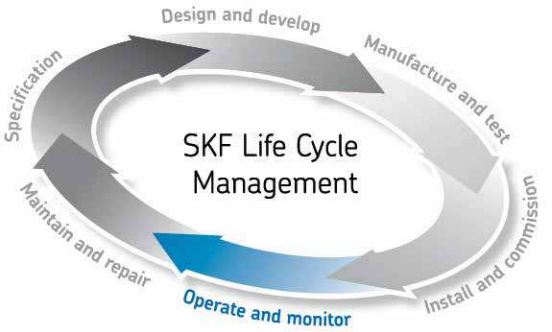
WI203 - Vibration analysis level 2 – data analysis

Recommended for

Condition monitoring and reliability personnel seeking an understanding of data analysis and how to make decisions from the information that stems from a condition monitoring program.

Course objective

The participants will review the fundamentals of vibration analysis and then further their understanding of data analysis of machinery and componets as well as advanced testing techniques.



SMRP APPROVED PROVIDER

Public course: 4 days, $1,395 per participant

Optional CMVA certification exam on 5th day

Private course: please inquire

Exam fee: $350

CVMA membership fee additional

Private course: please inquire

Specific topics include

Principles of vibration

- Definitions, usages, relationships, calculations and plots
- Data acquisition: technical aspects, testing, data formats, data quality

Signal Processing

- Sampling, windowing, filters
- Lowest resolvable frequency
- Resolution and averaging
- Dynamic range

Condition Monitoring

- Preventative and predictive maintenance
- Database management
- Data collection scheduling and compliance

Fault analysis

- Imbalance, misalignment, mechanical looseness, impeller or blade problems
- Journal and rolling bearing defects
- Electric motor defects, gearing problems
- Resonance and critical speeds

Acceptance testing

- Interpretation of specification and standards
- Instrument setup based on standards

Equipment testing and diagnostics

- Frequency response function
- Bump test
- Run up / coast down tests

Reference standards

- ISO, IEC, severity chart guidelines and limitations

Reporting and documentation

- Condition monitoring reports, documentation
- Vibration diagnostics

Fault severity determination

- Severity definition and parameters

Hands-on practice

Exam preparation

Public course 2018 schedule

Sudbury	January 22-25	Regina	July 16-19	Edmonton	September 10-13
Calgary	February 5-8	Montreal	July 23-26 (F)	Vancouver	November 5-8
Toronto	June 11-14				

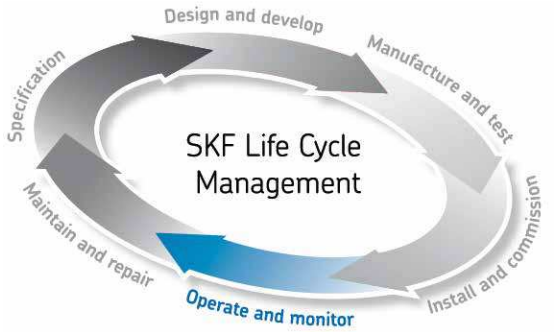
WI205 - Vibration analysis – advanced results

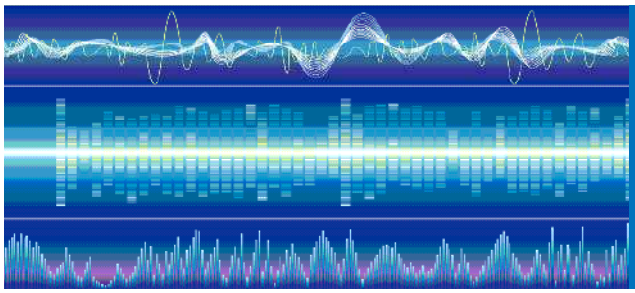
Recommended for

Condition monitoring and reliability specialists, engineers and technicians responsible for interpreting vibration analysis results at an advanced level.

Course objective

This course focuses on troubleshooting strategies that lead to the true sources of the most common maintenance related vibration problems. Elevate your basic condition monitoring program beyond problem detection to provide true corrections and solutions.





Private course: please inquire

Specific topics include

Review of machinery vibration fundamentals

- Cause and effect
- Vibration terminology
- Relationships between time, frequency, amplitude and phase

Optimizing vibration detection and analysis

- Transducer selection and placement
- Optimising data collection parameters
- Application of advanced detection methods
- Practical approach to vibration alarm limits

Solving the most common vibration problems

- Resonance
- Imbalance
- Misalignment

Extending the life of rolling element bearings

- Common causes of premature failure
- Detection strategies
- Troubleshooting and prevention
- Proactive installation and lubrication
- Establishing practical acceptance testing limits

Amplitude, spectrum, time waveform and phase characteristics of machinery

- Beats, sidebands, harmonics
- Causes and effects of shaft motion
- Understanding bent shaft, gear, electrical and bearing symptoms

Private course available

- Please inquire | training.canada@skf.com

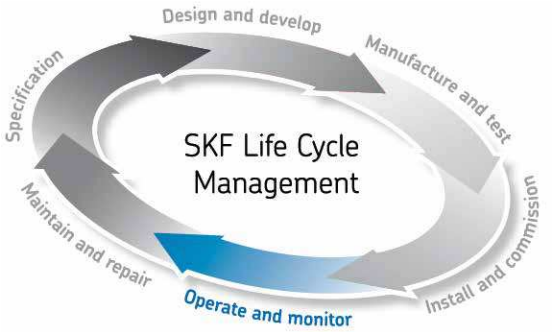
WI241 - Machine lubrication technician/analyst - level 1

Recommended for

Plant personnel in any aspect of machinery lubrication including maintenance, reliability and rotating equipment technicians, engineers and supervisors.

Course objective

This course introduces and establishes the role of precision lubrication and analysis for improving machine reliability.



Private course: please inquire

Optional ICML Certification Exam

A certification examination is available during the morning of day 5 for either the International Council of Machinery Lubrication Tehcnician or Analyst Level 1. Exam Fee - $350 per person

Specific topics include

Applied tribology

- Surface interaction modes – sliding and rolling
- Friction, wear and corrosion
- Protective films: hydrodynamic and elastohydrodynamic

Lubricant construction

- Lubricant categories
- Base oils, additives, thickeners, greases

Lubricant performance properties

- Oil, grease and additive performance measurement
- Basic calculations for relubrication intervals

Lubricant selection practices

- Bearings, gears, hydraulics, engines

Lubricant application

- Grease: dispensing tools, metrics and automatic systems
- Oil: dispensing tools, metrics and automatic systems

Lubricant storage and handling

- Lubricant consolidation
- Bulk and packaged product receipt and storage
- Lubricant storage containers
- Storage of grease guns and other lube application devices
- Health and safety

Lubricant condition and contamination control

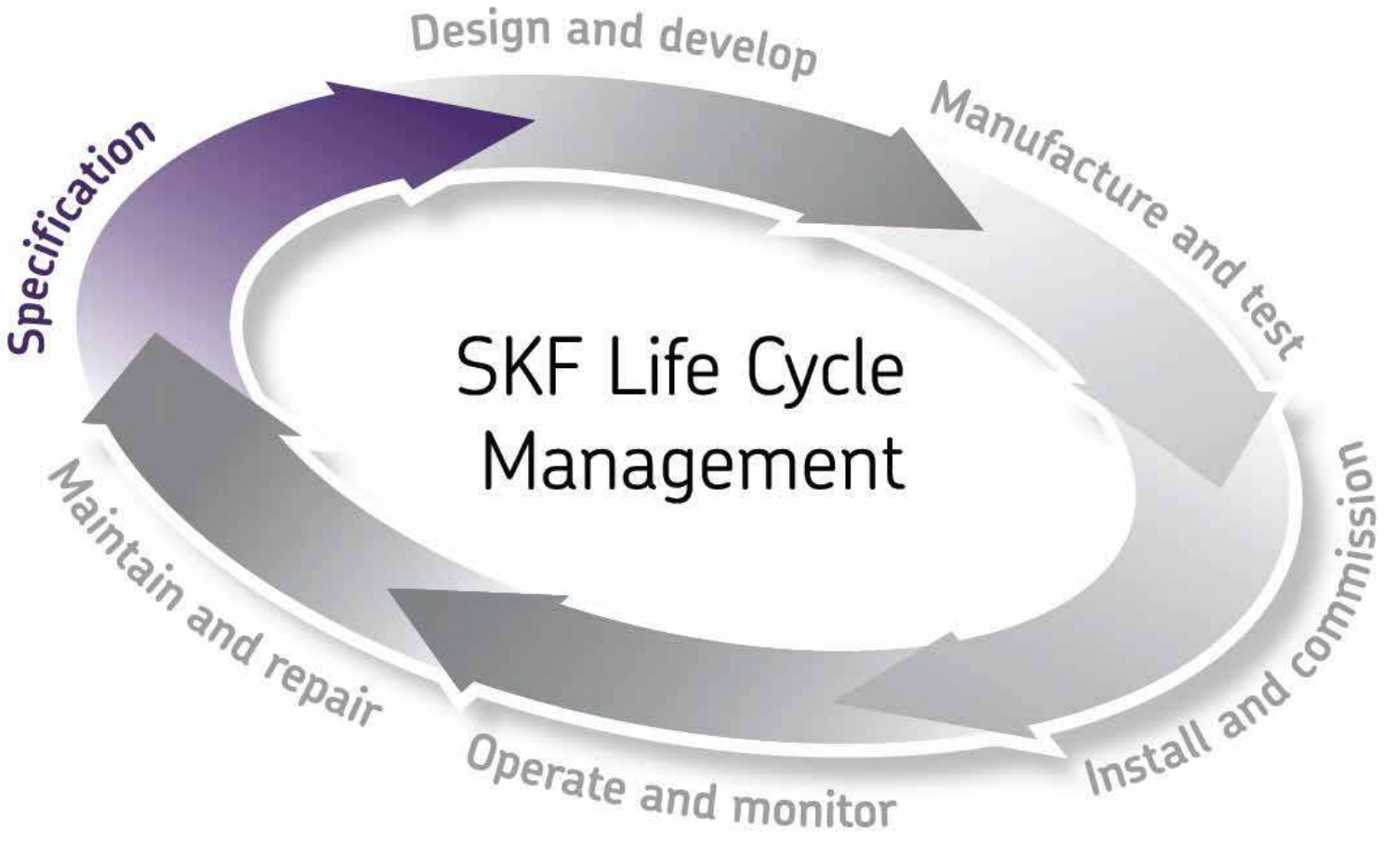
- Types of contaminants and removal
- Filtration and separation technologies
- Sump management
- Lubricant sampling methods: objectives, methods, quality, intervals
- Monitoring chemistry, contamination and wear debris

Lubricant health monitoring

- Failure mechanisms: oxidation and thermal degredation
- Additive depletion and degradation
- Mixed lubricants, viscosity and additive discrepancies
- Spectroscopy and atomic measurement

Private course available

- Please inquire | training.canada@skf.com



Specification

Working with designers to find the right solution, right from the start

SKF Engineering consultancy services can support your project with expert advice and technology selection assistance. We can help you tap into decades of SKF application knowledge with both equipment manufacturers and aftermarket customers.

As you develop your specification, our research and development programmes and testing facilities can support project conception and feasibility. We can help you choose from thousands of off-the-shelf products, as well as fully customized solutions, to help your project become a reality.

Our offers include:

- SKF Asset management consultancy services
- SKF Engineering consultancy services
- Research and development
- Design for Six Sigma
- Reliability training
- Catalogue and customized products

AMS330 - Asset management overview

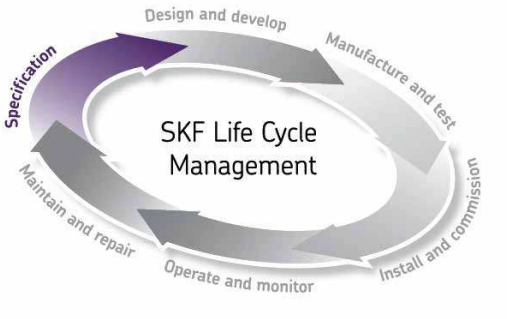
Recommended for

Maintenance professional, technicians, group leaders and above.

Course objective

This five day program will enable employees to see how their role contributes to the bottom line as well as providing them with a general understanding of other roles and their contribution towards making their own job safer and easier. This general training also covers some of the common tools used in asset management systems.

The training can be given in 5 straight days, 5 one day sessions or 10 half day sessions to meet with production requirements.



Private course: please inquire

Specific topics include

Day one

- General introduction
- Asset efficiency optimization

Day two

- Needs analysis
- Key performance indicators
- Reliability centred maintenance

Day three

- Spare part optimization
- Operator driven reliability

Day four

- Planning and scheduling
- Root cause analysis

Day five

- Bad actor management
- Six Sigma
- Failure reporting and corrective action system

Private course available

- Please inquire | training.canada@skf.com

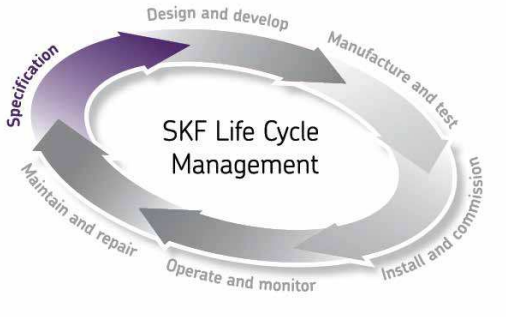
AMS331 - Applied physical asset management

Recommended for

Reliability engineers and technologists.

Course objective

This course will link together performance objectives (what we want to do), execution (what we can do) and what needs to be done to align both to achieve and sustain coporate objectives.



Private course: please inquire

Specific topics include

Physical asset optimization principles

- Identifying assets
- Assigning criticality

Best practices

- Reducing component failures

Valued results

- Increasing economic life

Life cycle costs

Implementation success

Private course available

- Please inquire | training.canada@skf.com

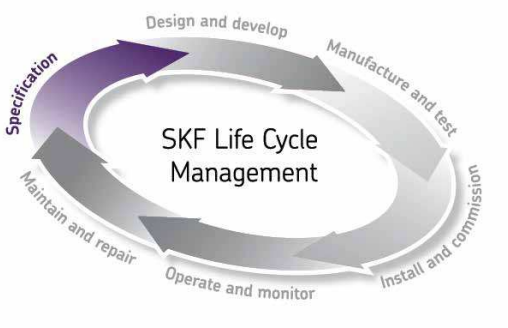
AMS332 - Reliability centred maintenance (RCM/SRCM)

Recommended for

Reliability engineers and technologists.

Course objective

Students will learn to use the analytical tool or RCM/SRCM, to identify cost-effective solutions to critical failure modes. They will also learn to assist the planners and maintainers in understanding the intent of the maintenance tasks and the importance of implementing correctly those same tasks.



Public course: 2 days, $1,195 per participant

Private course: please inquire

Specific topics include

Reliability centred maintenance principles

- Understand the evolution of RCM
- Understand the business context of RCM

RCM Essentials

- Criticality matrix
- How to select which system to analyze
- Failure modes and effects

What should be done?

- FMECA
- Functions and functional failures
- Criticality of failures
- Failure patterns

Implementation and improvement

- Applying maintenance tasks
- Task selection and MTBF
- Decision tree

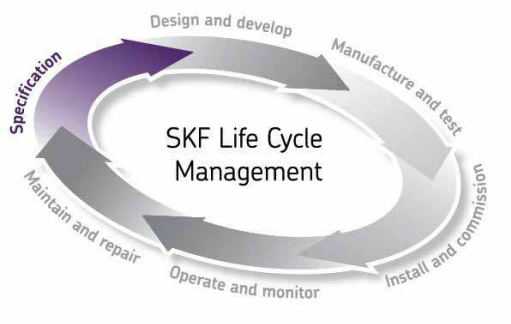
Public course 2018 schedule

- Toronto May 8-10

SSYB001 - Six Sigma Yellow Belt

Recommended for

Participants who have interest or need to develop their Six Sigma foundational knowledge. Yellow Belt can be for entry-level employees who seek to improve their knowledge of Six Sigma fundamentals or for executive champions who require an overview of Six Sigma and design, measure, analyze, improve, control (DMAIC) approach.



Course objective

Students will learn the approach of advancing the concept and potential of using Six Sigma tools and methodologies within organization. The focus is on the Six Sigma concepts and learning how to use the A3 (structured problem solving and continuous improvement) tool.

Private course: please inquire

Specific topics include

- Fundamentals of Six Sigma principles, roles, and value to the organizatior
- The tools used for the mandatory steps in Six Sigma DMAIC Roadmap
- Define the project goals and deliverables
- Measure and validate baseline process parameter
- Identify vital few process inputs that affect the output
- Generate and implement optimal solution
- Ensure that the result will last

Yellow 6 Belt

Private course available

- Please inquire | training.canada@skf.com

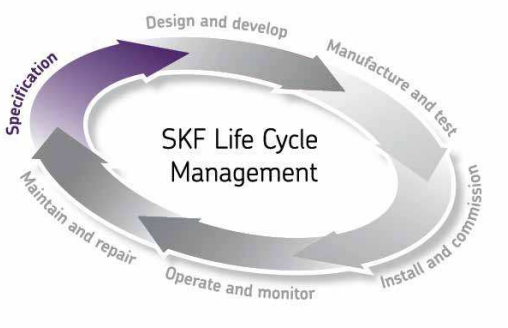
LE001 - Lean Excellence

Recommended for

Managers and employees who are keen to get an overview and general understanding of the Lean methodology, its possibilities and applicable areas in the business.

Course objective

This course will showcase an understanding of the concepts, tools and principles of lean.



Private course: please inquire

Specific topics include

- The history of Lean
- Fundamentals of lean principles
- How do you define value
- The cost of poor quality
- Lean tools: brainstorming, affinity diagram, process flow charts, 5S, etc.
- Difference between the lean philosophy and Six Sigma.
- How do you pursue perfection?

Private course available

- Please inquire | training.canada@skf.com

www.skf.ca/sts

Visit **www.skf.ca/sts** for access to a digital copy of the Training Solutions as well as the course registration form

Courses by Life Cycle Management stages

Specification

Design and develop

Maintain and repair

Install and commission

Operate and monitor

Courses by role

Reliability team

Course Code	Course description	Page
WE202	Reliability of rotating machines	15
BSD301	Bearing system design	23
WE204	Root cause bearing system failure analysis	22
RCA302	Root cause analysis	24
AMS101	Maintenance & Reliability Best Practices	25
SS101	SmartStart – product start up training	27
SM101	SiteMentor – advanced product training	27
WI202	Vibration analysis level 1 - data collection	33
WI203	Vibration analysis level 2 - data analysis	34
WI205	Vibration analysis - advanced results	35
AMS330	Asset management overview	38
AMS331	Applied physical asset management	39
AMS332	Reliability centred maintenance	40

Maintenance team

Course Code	Course description	Page
	Best practice classes	8
WC200	Maintenance planning and scheduling	14
WE201	Bearing maintenance and technology	13
WE202	Reliability of rotating machines	15
WE203	Lubrication of rolling element bearings	16
WE241	Precision maintenance skills	
	Laser shaft alignment and rotor balancing	17
WE242	Precision maintenance skills	
	Rotor components and power transmission	18
WE250	Dynamic field balancing	19
WC230	Spare parts management & inventory control	20
WICM350	Advanced SKF Microlog and @ptitude Analyst applications	31
WI241	Machine lubrication technician/analyst - level 1	36

Engineering team

Course Code	Course description	Page
WE202	Reliability of rotating machines	15
WE250	Dynamic field balancing	19
BSD301	Bearing system design	23
WE204	Root cause bearing system failure analysis	22
RCA302	Root cause analysis	24
AMS101	Maintenance & Reliability Best Practices	25
WI241	Machine lubrication technician/analyst - level 1	36
AMS330	Asset management overview	38

Course registration form

PDF form available online at: www.skf.ca/sts

Registrant Information (please print)

Discount applies when two or more register from the same company

Course Name: _____ Course Dates: _____

Participants Name: _____ Title: _____

Participants Name: _____ Title: _____

Participants Name: _____ Title: _____

~~Or~~ganization: _____

Billing Address: _____

City: _____ Province: _____ Postal Code: _____

Tel: _____ Fax: _____ E-mail: _____

Payment Method (please select your payment method of choice)

☐ Cheque Enclosed Cheque # (payable to SKF Canada Ltd.): _____

☐ VISA Credit Card Number: _____

☐ MasterCard Name on Card: _____ Expiry Date: _____

☐ Electronic Funds Transfer (EFT)

Please mail, e-mail or fax the completed registration form to

Option 1

SKF Training Solutions

Lubhani Sharma

928 72nd Avenue

NE Calgary, Alberta T2E 8V9

- Tel: 403-519-1655
- Email: training.canada@skf.com

Option 2

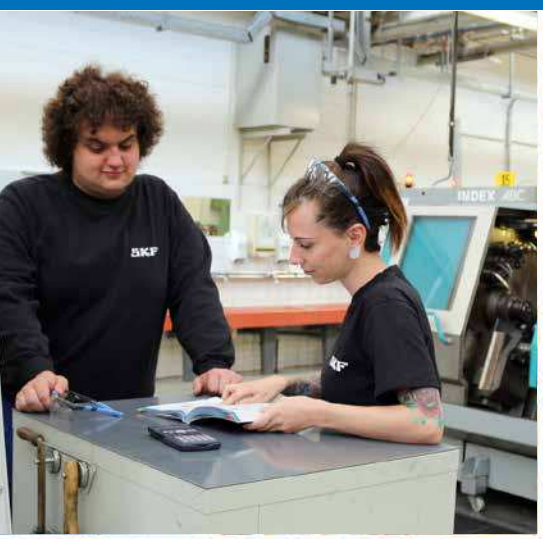
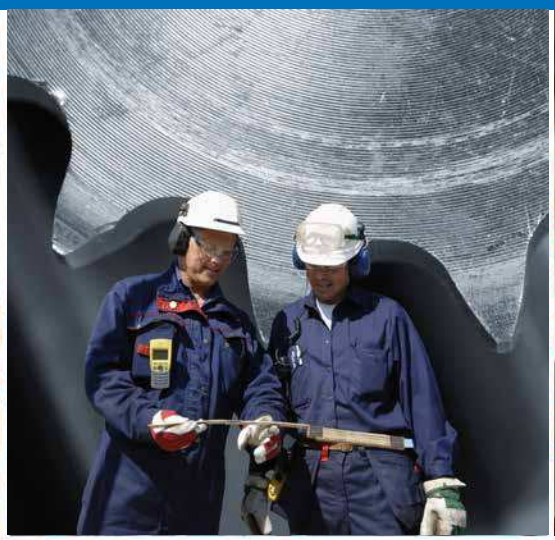
Your local SKF Authorized Distributor

Cancellation Policy

Cancellation will only be accepted in writing (email).

Cancellation within two weeks of the course start date will be subject to charges equal to 100% of the course fee. The registrant may send a delegate in their place. The registrant may reschedule their training to the next available course offering with a 20% rebooking fee.

Cancellation on the part of SKF will result in full course fee refunds.





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