



SKF India Limited

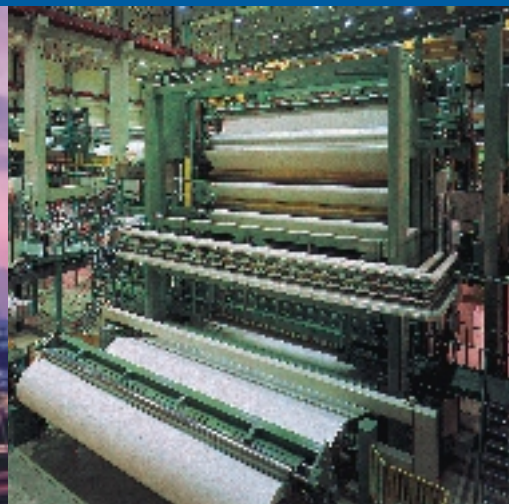
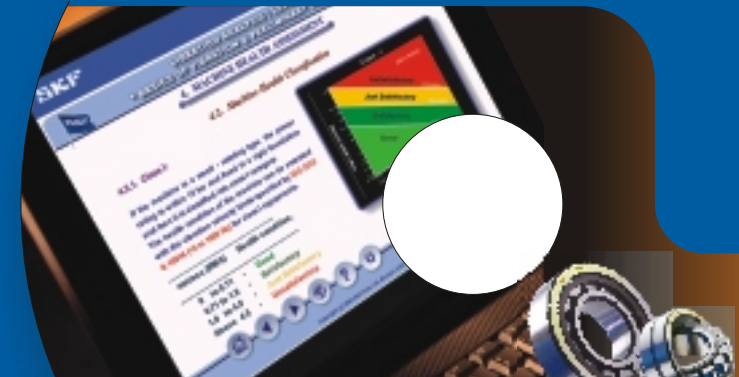
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SKF Self-Learning Tools



SKF Self Learning Tools

Complete Learning Tools for maintenance Engineers

SKF India Limited ,bearing leader, has come out with unique self learning tools for maintenance engineers . We have developed Self learning tools covering vibration analysis ,Maintenance procedures and Bearing technology. Bearing technology package is unique and comprise of 5 SLT's on basics, Mounting, Dismounting and Vibration analysis of Rolling element & plain bearings .

Founded in 1907, with nearly 100 years of application experience and close working partnerships with customers in virtually every industry, SKF can rightly be called a leader as well as an innovator in developing solutions for improving the industrial processes.

The SKF Reliability Maintenance Institute, an integral part of SKF, focuses on disseminating maintenance related knowledge worldwide. It offers various programs that are developed for easy application. Like the on-site training program, wherein the training is conducted at an individual's own plant, the training at the various SKF sites, regional locations, and also through the interactive Computer Media known as the SKF Self-Learning Tools. These SKF Self-Learning Tools are a one-stop solution

for learners at various levels including the students of mechanical and other engineering streams. They eliminate the need to take time off from work and to travel long distances to acquire knowledge, thereby reducing the costs considerably. They offer impartial assessment, and facilitate you to update your competencies and acquire new skills at your will, 24 X 7. These tools are periodically updated to reflect the current technology trends and practices. They are also a solution to finding the 'right trainers', delivering consistently in quality and cost.

More than 30 titles in the offering ensure full and proper coverage of all the segments and applications. Out of them 5 have already been introduced and are as follows:

- SLT 1 : Vibration Analysis : (Level 1) "Basics of Vibration & Preliminary Analysis
- SLT 2 : Vibration Analysis : (Level 2) "Vibration Analysis & Problem Diagnostics
- SLT 3 : Vibration Analysis of Industrial Fans
- SLT 4 : Diagnostics of Cement Plant Machinery
- SLT 5 : Dynamic Balancing (Level 1)
- SLT 6 : Basics of rolling element bearings
- SLT 7 : Mounting of rolling element bearings
- SLT 8 : Dismounting of rolling element bearings and failure analysis
- SLT 9 : Vibration Analysis of Rolling element bearings
- SLT 10 : Vibration Analysis of plain bearings
- SLT 11 : Vibration Analysis of Electrical machines



Module: SLT1

Basics of vibration & preliminary analysis (Level 1 Vibration Analysis)

Objective:

This SLT explains with clarity and simplicity, the theory and precise simulations of the basics of vibration, vibration measuring instruments, the ISO standards followed by the industry, and the methods of doing a simple vibration analysis.

List of Topics:

- What is Vibration.
- Characteristics of Vibration.
- What is Condition Monitoring.
- Machine Health Assessment as per ISO standards.
- Basic Diagnostics.
- Analysis Procedures.

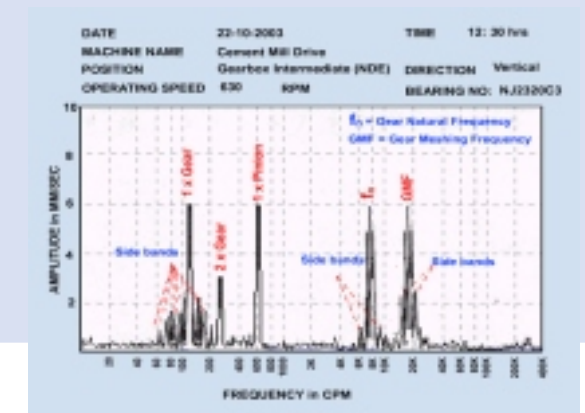
High Points:

- This CBT gives a never before in-depth overview of:
1. All the fundamentals.
 2. The basic knowledge required understanding Vibration Analysis.

It is paramount to understand Level-1 before attempting to understand Level-2, 'The advanced diagnostics procedures'.

The Icing on The Cake:

Practical Tips, Exhaustive Case Studies and Stimulating Exercises.



Module: SLT2

Vibration analysis & problem diagnostics (Level 2 - Vibration Analysis)

The universal fact is that industrial equipments are subjected to rigorous operating conditions. Therefore, the possibilities of a break down from various inaccuracies and problems are quite significant. Hence, a predictive maintenance based machinery problem diagnostics is a must in ensuring a trouble-free operation. Though there are many methods of machinery fault diagnostics (condition monitoring for example), one of the most effective methods is 'vibration analysis'.

Objective:

This SLT demonstrates vibration analysis and problem diagnostics of all the major machinery problems through spectrum & phase characteristics, which are common for all the industrial equipments.

List of Topics:

- Unbalance.
- Misalignment.
- Mechanical Looseness.
- Bent Shaft.
- Eccentricity.
- Coupling Inaccuracies.
- Bearing Defects.
- Gear Related Problems.
- Defective Belt Driven System.
- Inadequate Rigidity.
- Rubbing.
- Distortion.
- Piping Forces.

High Points:

- This CBT gives a never before in-depth overview of:
1. Common Machinery Problems

The Icing on The Cake:

Practical Tips, Exhaustive Case Studies and Stimulating Exercises.



Module: SLT 3

Vibration analysis of industrial fans

Objective:

This SLT discusses in detail the vibration analysis of industrial fans.

List of Topics:

- Classification of fans.
- Types.
- Various parts.
- Vibration analysis of Industrial Fans

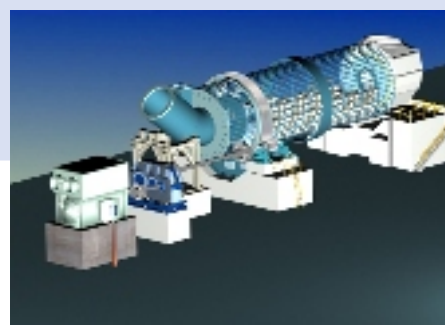
High Points:

This CBT gives a never before in-depth overview of:

1. Major problems that can occur in the process fans.

The Icing on The Cake:

Practical Tips, Exhaustive Case Studies and Stimulating Exercises.



Module: SLT 4

Diagnostics of cement plant machinery

In the cement industry, a high level of diagnostic accuracy is expected from vibration analysis because of the non-availability of stand-by equipments. There is also the need for continuous and trouble-free operation of all the critical equipments.

Objective:

This SLT discusses Vibration analysis of cement plant equipments in detail.

List of Topics:

- Cement Plant - Division & Sections Wise Equipment Details.
- Vibration Analysis & Problem Diagnostics of Cement Plant Machineries.

High Points:

This CBT gives a never before in-depth overview of:

1. Problem diagnostic procedures with spectrum & phase characteristics using vibration analysis.

The Icing on The Cake:

Practical Tips, Exhaustive Case Studies and Stimulating Exercises.



Module: SLT 5

Dynamic balancing

Unbalance has been identified as one of the most common causes of machinery vibration that is present to some degree on all the rotating machines. To achieve dynamic balancing a lot of theoretical as well as practical knowledge is required. Correcting unbalance and effectively applying suitable techniques require additional knowledge and understanding.

Objective:

This SLT discusses the types of unbalance and methods of balancing in detail.

List of Topics:

- What is Unbalance.
- Types of Unbalance.
- Identification of Unbalance.
- In-situ Dynamic Balancing.
- Types of Balancing.
- Balancing Procedure for Single Plane Balancing.

High Points:

This CBT gives a never before in-depth overview of:

1. Unbalance and In-situ dynamic balancing.

The Icing on The Cake:

Practical Tips, Exhaustive Case Studies and Stimulating Exercises.

Module: SLT6

Basics of Rolling Element Bearings

Objective:

This CBT gives an insight on the basics of bearings and will primarily focus on types of bearings, bearing terminology, dimensions, tolerances, clearances, materials, designations, designs, load factors, bearings size, application, lubrication, mounting & dismounting. It also consists of exercises that will gauge your understanding of the basics of rolling element bearings.

List of Topics:

- Bearing Terminology, Bearing General Data, Bearing Types, Selection of Bearing Type, Selection of Bearing Size, Application of Bearings.
- Lubrication.
- Mountings & Dismounting.

High Points:

This CBT gives a never before in-depth overview of:

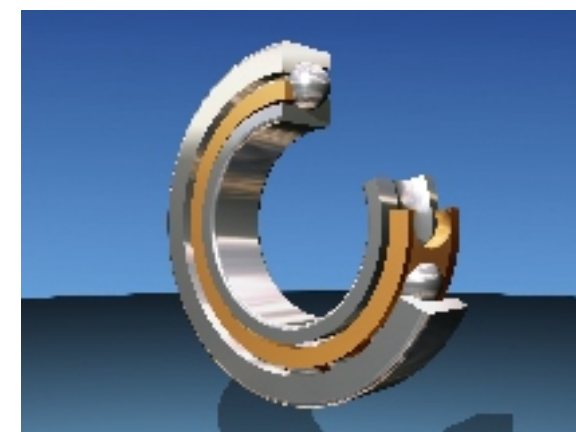
1. Bearing Design.
2. Bearing Selection.
3. Application and Lubrication.

This knowledge will be a springboard for the user and will help him in understanding the CBT that covers Vibration Analysis of Bearings, Mounting and Dismounting better.

The Icing on The Cake:

Practical Tips, Exhaustive Case Studies and Stimulating Exercises.

*The Bearing Technology package comprises of 5 SLT's, namely, Basics, Mounting, Dismounting and Vibration of Rolling element bearings and plain bearings.



Module: SLT-7

Mounting of Rolling Element Bearings

It's staggering to know that around 16% of all premature bearing failures are caused by poor fitting. The common causes are using of too much force or simply being unaware of the presence of the correct mounting tools and methods. The methods generally used for the correct and efficient mounting are Mechanical, Heat or Hydraulic application methods.

Objective:

This SLT gives information about professional fitting with the usage of specialized tools and techniques, which in turn will help in achieving maximum machine uptime.

List of Topics:

- Overall Objective.
- Preparation for Mounting, Cold Mounting, Hot Mounting.
- SKF Drive-up Method and Mounting Tools.

High Points:

This CBT gives a never before in-depth overview of:

1. Methods of mounting using the correct tools.
2. Ways to increase the life of the bearing with minimal wear and tear.

The Icing on The Cake:

Practical Tips, Exhaustive Case Studies and Stimulating Exercises.





Module: SLT 8

Vibration Analysis of Rolling Element Bearings

Condition monitoring of Rolling Element Bearings using Vibration Analysis can prevent majority of problems and failures.

Objective:

This CBT is designed to teach you more about the Basics of Rolling Element Bearings. This SLT covers vibration theory and bearing vibration in detail.

List of Topics:

- Basics of Vibration (Refer our previous SLT ' Basics of Vibration and Preliminary Analysis level 1' for more details).
- Bearing Vibration, Variable Compliance Vibration.
- Geometrical, imperfections and SEE (Spectral Emitted Energy).
- Random Ultrasonic frequencies, Natural Frequencies of Bearing Components.
- Spike Energy Measurements, Rotational Defect frequencies.
- Bearing damages & Failure (Refer our previous SLT ' Dismounting of Rolling Element Bearing and Failure Analysis' for more details.)

High Points:

- This CBT gives a never before in-depth overview of:
1. Vibration Analysis of Rolling Element Bearing to find out the exact problems of bearing during operation.
 2. Methods of reducing in the stoppage of machinery.
 3. Methods of increasing the life of machine/bearing.

The Icing on The Cake:

Practical Tips, Exhaustive Case Studies and Stimulating Exercises.

Module: SLT 9

Dismounting of Rolling Element Bearings and Failure Analysis

When shafts and bearings are damaged during the dismantling of bearings, there is always a cost associated with it, in terms of both time and material. In addition, the use of the wrong tools and techniques for dismantling can be hazardous to the operator.

Objective:

This CBT basically gives information about as to how dismantling of bearings can cause damage to both the bearings and associated components, if incorrect tools and techniques are used and demonstrates ways to avoid the same.

List of Topics:

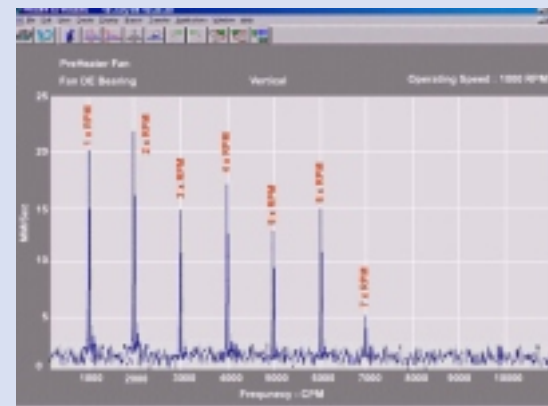
- Basic Principles.
- Cold Dismounting, Hot Dismounting, Dismounting Tools.
- Bearing Damages and Failures

High Points:

- This CBT gives a never before in-depth overview of:
1. Methods of dismantling of bearings using the correct tools.
 2. Ways to increase the life of the bearing with minimal wear and tear.

The Icing on The Cake:

Practical Tips, Exhaustive Case Studies and Stimulating Exercises.



Module: SLT-10

Vibration Analysis of Plain Bearings

Where reliability and life of the equipment is particularly important, Plain Bearings are the predominant choice. They are used to position the rotors of high power turbo machinery, ship propulsion machinery and other equipments.

Objective:

This SLT gives information about the Selection, Operation and performance characteristics of Plain Bearings. It also includes vibration analysis and diagnostic studies with common vibration problems that can occur in plain bearings. A case study on a turbine generator set is also discussed in this SLT.

List of Topics:

- Journal Bearings (Hydrodynamic Bearing Pressure, Eccentricity, Rotor Instability), and Classifications of Journal Bearings,
- Vibration In Bearings.
- Common Bearing Problems.

High Points:

- This CBT gives a never before in-depth overview of:
1. Vibration Analysis of Plain Bearing to find out the exact problems of bearing during operation.
 2. Methods of reducing in the stoppage of machinery.
 3. Methods of increasing the life of machine/bearing.

The Icing on The Cake:

Practical Tips, Exhaustive Case Studies and Stimulating Exercises.

Module: SLT 11

Vibration Analysis of Electrical Machines

Vibration Analysis is one of the best methods to diagnose all types of defects and inaccuracies in electrical machines. Electrical machines will be subjected to all inaccuracies like any mechanical equipment. In addition, these machines shall be subjected to all types of electrical inaccuracies as well. Therefore, the Vibration Analysis of electrical machines are much complex than mechanical equipments. The method of using Vibration Analysis to identify mechanical defects is separately covered in our earlier SLTs and the same methodology shall be equally applicable on electrical machines such as motors, generators etc.

Objective:

This SLT covers the "Vibration Analysis and Diagnostic Studies of Electrical machines" such as motor, generators etc.

List of Topics:

- General Construction of Electrical Machines
- Vibration Analysis of Electrical Machines
- Line frequency Vibration and Slot Frequency Vibration.
- Stator and Rotor Defects.
- Non-Uniform Air Gap and MMF.

High Points:

- This CBT gives a never before in-depth overview of:
1. Methods of using Vibration Analysis of electrical machines to find out the exact problems causing various defects such as the Stator and Rotor Defects, Non Uniform Air Gap etc.

The Icing on The Cake:

Practical Tips, Exhaustive Case Studies and Stimulating Exercises.

