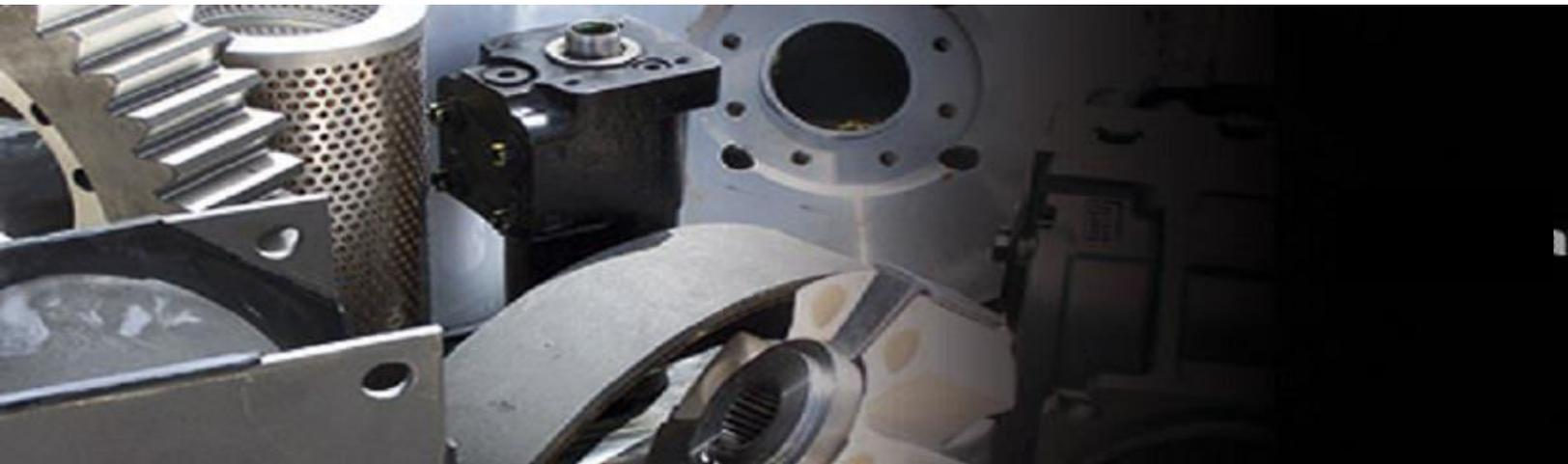




DISTANCE TRAINING CERTIFICATION

EXECUTIVE DEVELOPMENT PROGRAMMES



COURSE BACKGROUND

In order to attain top performance in maintaining its assets, a company needs a comprehensive approach that depends on the integration of people, plant and processes. IMME provides value by helping to create trained teams who understand asset performance management at strategic reliability level to assist improving business profitability.

Identifying and embracing the best practices in maintenance and reliability enables an organization to avoid failures, reduce breakdown maintenance work and cut down other barriers to success while maintaining safe reliable operations and minimizing costs. IMME helps companies reach their maintenance reliability goals by way of building capacity and competency – knowledge, skill, motivation, initiative, team work, etc.

Five ‘Distance Training Certification Executive Development Programmes’ have been designed as specialized training courses for maintenance engineers, managers and technical

executives with a view to strengthen their managerial competence, enhance system capabilities, help achieving optimum performance, and stimulate manufacturing excellence.

The maintenance and reliability teams need to be efficient, well organized, cost-effective and innovative to realize higher plant availability and smooth operations. ‘Distance Training Certification Executive Development Programmes’ provide comprehensive learning and help building skills and requisite talent for achieving higher economical efficiency in plant operations.

FIVE DISTANCE TRAINING CERTIFICATION EXECUTIVE DEVELOPMENT PROGRAMMES

IMME offers the following five different ‘Distance Training Certification Executive Development Programmes’:

- **EDP-I** : Maintenance Cost-effectiveness and Spare Parts Management
- **EDP-II** : Planned Preventive and Predictive Maintenance System and Practices
- **EDP-III** : Machine Failure Analysis and Reliability & Maintainability Improvement
- **EDP-IV** : Creativity & Creative Problem-solving and Value Analysis in Maintenance
- **EDP-V** : Grand Quiz in Maintenance Management

Based on individual requirements, candidates can register for one or more programme(s) simultaneously by forwarding separate registration form(s) and paying corresponding course fees.

COURSE MISSION

To equip maintenance reliability personnel to achieve higher dimensions in managing maintenance function and help realize greater value to their skills, competence and professional acumen.

PARTICIPATION

Maintenance engineers, managers, technical executives, etc. working in different industries are eligible for programme registration.

DURATION

6 Months (*for one EDP*)

MODUS OPERANDI

Candidates receive complete set of e-books for the programme(s) they have enrolled for. Each programme e-books are specially prepared by IMME by incorporating articulate knowledge, lucid presentation, educative examples & case studies, relevant forms & formats, expert quizzes & exercises, etc. with focus on easy learning. Course instructions are forwarded to the candidates through e-mails. Candidates send back their answer papers for evaluation within the scheduled time. Answers forwarded by the candidates within the specified time schedule are examined by IMME, and depending on their satisfactory performance, they are awarded 'Certificate of Competence' in the respective Executive Development Programme(s).

CERTIFICATION

Based on the performance evaluation, the successful candidates are awarded 'Certificate of Competence' in the respective Executive Development Programme(s).

ABOUT THE COURSE DIRECTOR

Course Director: *Mr. J. K. Sharma, Maintenance Reliability Professional, IITian, Executive Coach, Ace Trainer, 35+ Year Exp. & more*

LinkedIn Profile: [linkedin.com/in/jitendra-kumar-sharma-61080652](https://www.linkedin.com/in/jitendra-kumar-sharma-61080652)

Mr. J. K. Sharma is working as Director (Courses) and Principal Consultant at Institute of Maintenance Management Education and is the in-charge of the course along with a team of experienced faculty members. Mr. J. K. Sharma has more than thirty five years of rich and diversified experience spent on training, consultancy, research & development programmes related to maintenance & reliability. He is a Bachelor of Engineering from a premier institution, namely Indian Institute of Technology, Roorkee, India and Masters in Industrial Engineering with specialization in Plant Engineering and Maintenance Management from Training Institute for Productivity and Industrial Engineering (now, Dr. Ambedkar Institute of Productivity), Chennai. As a specialist and renowned faculty in the field of maintenance & reliability, he has designed and conducted a large number of seminars, workshops, in-house & virtual training programmes, distance training courses, industrial audits, surveys and assignments in his long professional career. He continues to inspire maintenance reliability community and plays a key role in improving productivity, efficiency and effectiveness of maintenance function in manufacturing industries.

He was also involved in conducting a prestigious national survey on 'Maintenance Systems and Practices' in different sectors of industry besides organizing various seminars, workshops and other development activities under the auspices of National Productivity Council, India where he worked as Deputy Director (Plant Engineering) in 1970s. The reports of this survey were published and later on tabled in the Indian Parliament also.

He has successfully conducted scores of top quality training programmes & courses, workshops and seminars on different themes & modules and trained tens of thousand of maintenance managers, plant engineers, technical executives, team leaders, supervisors, technicians, etc. from a large number of reputed companies in the corporate sector in a period of over thirty five years. He has also carried out various consultancy assignments and authored several papers and training modules based on various aspects of maintenance reliability function and worked in association with foreign experts, consultants and trainers.

COURSE DETAILS

Broad details of the five different 'Distance Training Certification Executive Development Programmes' are given below:

EDP - I

MAINTENANCE COST-EFFECTIVENESS AND SPARE PARTS MANAGEMENT

INTRODUCTION

Maintenance Cost-effectiveness:

- In present environment of global competitiveness, cost-effectiveness has become synonymous for success. Maintenance, including opportunity cost due to downtime, constitutes a major portion of controllable cost, and therefore achieving maintenance cost-effectiveness through proper and efficient management of maintenance function is of paramount significance for any industry as it directly influences the cost of production. In case of many organizations, maintenance resources are not utilized optimally resulting into over maintenance, losses, wastage, delays, inefficiency, downtime, etc. Also there could be some important areas which remain neglected, and do not receive adequate attention or resource allocation, thus resulting into additional loss of profit.
- Broadly, total maintenance cost constitutes two major components – direct cost and indirect cost. While direct maintenance cost is able to find entry in the books of accounts, indirect maintenance cost usually finds no proper place to be accounted for. A timely small maintenance cost often results in higher savings. There are however various other factors that influence equipment life-cycle cost, plant productivity and consequently manufacturing costs.
- 'What you do and how you do in maintenance is of insignificant value if it's not cost-effective!'. Maintenance cost-effectiveness not only means cutting down the roots of excessive costs but also to optimize the overall maintenance costs through meaningful efforts and action plans. This programme aims to provide deeper insights and understanding of the

approaches for maintenance cost-effectiveness in industry and the ways and means of achieving it in a successful manner.

Spare Parts Management:

□ Spare parts Management plays an important role in achieving the desired plant availability at an optimum cost. Today's industries are more and more capital intensive, mass production oriented and equipped with sophisticated technology. In these industries, downtime for plant and machinery is extremely expensive if spare parts are not available on time.

□ It's a paradox when on one hand, maintenance department complains about the non-availability of the spare parts to meet their requirement, on the other, finance department complains the problem of increasing locked up capital in spare parts inventory. This conflicting situation amply signifies the importance of spare parts management in any organization.

□ There are various problems faced by the organizations in managing the spare parts inventory. Firstly, there is an element of uncertainty as to when a part will be required and also the quantity of its requirement. This is due to the fact that the failure of a component, either due to wearing out or due to other reasons, can not be predicted accurately. Secondly, equipment spare parts need to be frequently procured from OEMs. New models are introduced to incorporate the design improvements and old models are phased out by the equipment manufacturers. Hence the spares for old models are not readily available. Particularly, this is more so in case of imported equipment as the design changes are taking place faster in the developed countries. Thirdly, the number and variety of spare parts are too large making the close control more and more difficult. Fourthly, there is a tendency from the stage of purchase of the equipment to the stage of the use of the spare parts to requisition spare parts more in number than that are actually required and thus accumulation of spares takes place. Finally, the rate of consumption of some spare parts is quite high and that for some spare parts is quite low. All these problems are faced in managing inventory of spare parts.

□ Spare parts management is to ensure the availability of spares for maintenance and repairs of the plant and machinery as and when required at an optimum cost. Also, the spares should be of right quality. Managing spare parts is mainly focused to reduce costs by way of ensuring optimum consumption and proper inventory control of various spare parts. Whereas high consumption of spare parts can be commonly recognized by way of rising cost of maintenance, the losses due to over-optimum spares inventory can be known only after proper analysis of inventory data. Often, many maintenance engineers do not precisely understand economical implications of over and under stocking of spare parts in their stores. Usually they know little about the inventory carrying cost in relation to certain items that are either over-stocked or remain unutilized for a longer period of time. The ailments of spares inventory get aggravated due to improper forecasts, generous indents, longer lead times, excessive consumption, emergency purchases, improper inventory control, cupboard inventory at shop-floor, etc.

□ Effective spare parts management requires adequate planning, optimum stocking policies and proper inventory control procedures to assure optimum inventory of spare parts.

COURSE STRUCTURE AND COVERAGE

EDP-I is structured to include two main topics, namely 'Maintenance Cost-effectiveness' and 'Spare Parts Management'. The course coverage is broadly mentioned as below:

- ***Maintenance Cost-effectiveness***

Maintenance Cost-effectiveness and Maintenance Cost Control, Role of Maintenance in Business Economics, Maintenance Productivity Improvement and Case Studies, Productive Maintenance Methods, Total Maintenance Cost Control Concept, Total Material Cost Control, Spare Parts Rebuilding, Maintenance Cost Reduction, Value Analysis to Reduce Cost, Role of Maintenance in Energy Conservation and Case Studies, etc.

- ***Spare Parts Management***

Problems in Spare Parts Management, Codification of Spare Parts, Maintenance Inventory Analysis and Selective Control – ABC, VED, SDE, HML, FSN and Other Analysis, Optimum Stocking Policies for Spare Parts, Assurance Levels for Spare Parts, Replenishment Systems, Spare Parts Planning, Reclamation of Parts and Economics, Management of Non-moving Inventory, Inventory Trend Analysis, etc.

- ***EDP-I Assignments***

Assignments are based on the programme topics, viz. 'Maintenance Cost-effectiveness' and 'Spare Parts Management'.



EDP - II

PLANNED PREVENTIVE AND PREDICTIVE MAINTENANCE SYSTEM AND PRACTICES

INTRODUCTION

Planned Preventive Maintenance System and Practices:

Effective planned preventive maintenance is necessary to preserve the inherent reliability of equipment and detect failure in sufficient advance time to plan, schedule and conduct a corrective action. If the PM's do not achieve either of these objectives in a cost effective way then we have to examine their validity. We need to be sure that planned preventive maintenance schedules are having a positive impact on plant reliability and we aren't simply following such activities because they are part of the maintenance program for many years. It is not uncommon to find that many Fixed Time Maintenance (FTM) tasks, such as scheduled overhauls and replacements are being done on periodic basis because that is what the plant has always done, and nobody has challenged the validity of these tasks. These tasks are often driven by the availability of time and maintenance people instead of the true validity of the tasks.

Let us now look at using PM's to preserve the inherent reliability of plant equipment. When commissioned, all plant and equipment have a level of inherent reliability that is mainly determined by the design, manufacture and installation factors. If equipment is correctly operated and maintained, equipment should achieve that level of inherent reliability. Such a result is achieved through scheduled replacement or restoration of worn parts or through tasks such as cleaning, lubrication, inspection and making various adjustments.

The purpose of carrying out PM schedules is to detect potential failures before they become real failures. This usually takes the form of preventive inspections, such as look, listen & feel, or certain simple monitoring checks. For every preventive maintenance check, data must be recorded and analyzed. If it is not recorded, analyzed and used to plan corrective action for the defects observed, then it may simply prove to be a futile exercise.

Predictive Maintenance System and Practices:

Predictive maintenance allows the user to evaluate the condition of equipment and avoid failures. It is based on monitoring condition of plant equipment and machinery by using various techniques in order to forestall a significant change which is indicative of a

developing fault. Predictive maintenance represents a diagnostic approach to plant maintenance to help taking timely action on the basis of realistic needs of maintenance. This practice is based on the objective checking of machine condition on a periodical basis and intended to provide quantitative measurement of wear and defects. Further, it's aimed to predict equipment problems and failures in advance to avoid the need of breakdown maintenance to a greater extent.

□ Unscheduled downtime in a large plant may cost tens of thousands of rupees per hour or more. Fortunately, predictive maintenance can help predicting developing problems in advance so that repair happens before disaster strikes. The use of predictive maintenance allows maintenance to be scheduled, or other actions to be taken to prevent failure and avoid its consequences. It has a unique benefit in that conditions that would shorten normal lifespan of the parts can be addressed before they develop into a major failure. It results in substantial savings by eliminating maintenance work too late or too soon and therefore helps in protecting from the ill-effects of both over and under-maintenance.

□ In distinct contrast to preventive maintenance, predictive maintenance makes use of a number of modern condition monitoring instruments to measure a whole range of parameters that prove detrimental to the health, condition and performance of plant equipment and machinery. It's a new generation technique brought out to meet the challenges of reducing downtime to a greater extent. Proper integration of predictive maintenance with preventive maintenance system and practices ensures far more effective control on downtime of plant equipment and machinery.

COURSE STRUCTURE AND COVERAGE

EDP-II is structured to include two main topics, namely 'Planned Preventive Maintenance System and Practices' and 'Predictive Maintenance System and Practices'. The course coverage is broadly mentioned as below:

- ***Planned Preventive Maintenance System and Practices***

The Maintenance Function, Effective Planned Lubrication, Effective Preventive Maintenance, Designing a Planned Maintenance System, Maintenance Work Order System, Maintenance Scheduling, Managing the Workload, Maintenance System for Monitoring and Controlling, Time to Attend Breakdowns: A Case Study, etc.

- ***Predictive Maintenance System and Practices***

Predictive Maintenance and Condition Monitoring Techniques – Ultrasonic Examination, Radiography, Thermography, Eddy Current Method, Magnetic Particle Examination, Liquid Penetrant Method, Spectrometric Oil Analysis Procedure (SOAP), Ferrographic Examination, Performance Trend Monitoring, Vibration Monitoring and Analysis, Shock Pulse Monitoring of Antifriction Bearings, Condition-based Predictive Maintenance - Examples and Cases, etc.

- ***EDP-II Assignments***

Assignments are based on the programme topics, viz. 'Planned Preventive Maintenance System and Practices' and 'Predictive Maintenance System and Practices'.



EDP - III

MACHINE FAILURE ANALYSIS AND RELIABILITY & MAINTAINABILITY IMPROVEMENT

Introduction

Machine Failure Analysis:

□ Machine failure analysis and control programme can be organized properly only by way of systematic recording and analysis of failure data, such as nature of failures, modes, frequencies, criticality, causes, downtime losses, etc. and subsequently taking most suitable corrective actions on the basis of causes of failures to avoid any recurrence of the problems. Whereas it's comparatively easy to bring forth and witness bad effects of machine faults & failures, quite sometimes, difficult situations arise in establishing the right causes and prescribe the correct remedies. However, it's by way of establishing the root causes only that any problem can be solved permanently. The way the machine failure analysis and control programme is planned and organized by maintenance department whether effectively or ineffectively will show a great impact on the downtime and the related costs. Maintenance department primarily owes responsibility for controlling downtime and the costs associated with it. The cost of downtime representing the loss of profit is often colossal and found varying in large proportions depending on the size of the plant. Even an increase or reduction in downtime by 1% in large plants often equals to a great amount of loss or profit respectively. The economical gains due to effective machine failure analysis and control programme can be sighted in substantial savings both in the direct and the indirect maintenance costs together with increased profitability for the company.

Reliability and Maintainability Improvement:

□ In any plant, it's necessary to maintain trouble-free status of critical machines for a desired period of time. Otherwise if any machine shows an undesirable pattern of failures, it's said to be unreliable and results in production loss. On the other hand, if a machine consumes too much time in trouble-shooting, restoration or repair, its maintainability is said to be poor and results in extended downtime. The problems of poor machine reliability and maintainability are mainly accountable to design problems, bad operation, poor maintenance skills & practices and unfavourable working environment. It's necessary for maintenance personnel to develop proper understanding of machine reliability and maintainability aspects. Reliability deals with trouble-free operation time for machines and how best it can be prolonged further. In other words, it means how to increase MTBF of plant and machinery. Maintainability however deals with the speed, economy and ease with which various maintenance and repair activities on different machines can be carried out. In other words, maintainability improvement of machines is primarily focused on reducing their MTTR. "Avoid the need of maintenance in the first place" and "Do maintenance efficiently when needed" are two fundamental principles representing importance of reliability and maintainability that ultimately determine availability of plant equipment and machinery. Reliability and maintainability factors are always considered critical in assuring higher machine availability, lower downtime and higher output from plant equipment and machinery.

COURSE STRUCTURE AND COVERAGE

EDP-III is structured to include two main topics, namely 'Machine Failure Analysis' and 'Reliability and Maintainability Improvement'. The course coverage is broadly mentioned as below:

- ***Machine Failure Analysis***

Classification of Failures, Failure Causes, Losses Due to Failures, Essential Elements of Failure Analysis and Control, Approaches to Control Failures and Downtime, Techniques to Diagnose Machine Faults, Breakdown Analysis and Case Studies, Designing and Organizing Failure Analysis and Control Programme, Logical Techniques, Case Study on Failure Codification and Analysis, etc.

- ***Reliability and Maintainability Improvement***

Machine Reliability, Maintainability & Availability Considerations, System Configuration and Analysis, Data Collection to Investigate Reliability and Maintainability, Estimation of MTBF and MTTR, Approaches to Improve Reliability and Maintainability, Case Studies on Reliability and Maintainability Improvement, etc.

- *EDP-III Assignments*

Assignments are based on programme topics, viz. 'Machine Failure Analysis' and 'Reliability and Maintainability Improvement'.



EDP - IV

CREATIVITY & CREATIVE PROBLEM-SOLVING AND VALUE ANALYSIS IN MAINTENANCE

Introduction

Creativity & Creative Problem-solving:

□ Creative problem solving process differs from routine problem solving in that with routine problem solving a pre-established method for solving the problem is used. However, with creative problem solving, any pre-established method for solving the problem is not employed. Creative problem solving involves hunt for new ideas, while routine problem solving uses old solutions. You can always use creative techniques to productively and proactively manage change in maintenance function; solve failure problems; improve equipment reliability; ensure cost-effectiveness; and produce innovation & continuous improvement.

□ Solving maintenance problems through creative techniques is to approach problems or address challenges in imaginative ways. Creative approaches to problem solving enable you to better use the knowledge and the skills you already have. They directly co-relate to creativity with problem solving. However, most of the time, we block our minds from thinking differently and find it easy to follow a certain norm so as to find quick, easy-to-fix solutions. In the long run, these shortcuts and conventional approaches do not really prove effective. Creative problem solving tools help us flex our minds, redefine the maintenance problems we face, find path-breaking ideas and take suitable actions. Solving maintenance problems through creative techniques is a simple process that involves breaking down a maintenance problem to understand it, generating ideas to solve the problem and evaluating those ideas to find the most effective solution.

□ Creativity exists in all plant people in different forms. It becomes imperative to harness creativity of plant people to achieve excellence in business operations. The challenge however arises from learning how to understand and use the creativity you have. It's all about overcoming our mind's conceptual blocks and finding multiple solutions to effectively deal with plant problems. It involves idea generation strategy and usually incorporates a team approach. This is owing to the fact that plant people inside their workplaces are allowed to engage in the process of change in search of the creative solutions.

Value Analysis in Maintenance:

□ Based on the concept of functional worth, value analysis is considered as an invaluable technique for cost reduction. Value analysis concept facilitates in evaluating and improving the function of an item v/s. cost. Value analysis requires logical as well as creative techniques for developing useful alternatives. It's worthwhile to examine expenditure in an organization and to decide the people who generate costs. All these cost generating people should be involved in value analysis programme and pushed a bit to go beyond their normal habit solutions. Unnecessary costs need to be identified and removed to stimulate a progressive change.

COURSE STRUCTURE AND COVERAGE

EDP-IV is structured to include two main topics, namely 'Creativity and Creative Problem-solving' and 'Value Analysis for Maintenance'. The course coverage is broadly mentioned as below:

- ***Creativity & Creative Problem-solving***

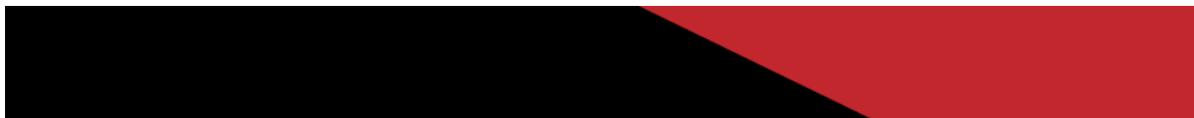
Introduction to Creativity, How to Develop Your Creative Potential, Creative Thinking and Problem-solving Management, Roadblocks to Creative Ideas, Techniques for Generating Ideas, Brainstorming Techniques, Solving Engineering Problems, etc.

- ***Value Analysis for Maintenance***

Value Analysis Concepts, Causes of Poor Value, Value Analysis for Reducing Costs, Value Analysis for Maintenance Functions, Questioning Techniques, Case Studies, etc.

- ***EDP-IV Assignments***

Assignments are based on programme topics, viz. 'Creativity & Creative Problem-solving' and 'Value Analysis for Maintenance'.



GRAND QUIZ IN MAINTENANCE MANAGEMENT

Introduction

Grand Quiz in Maintenance Management

□ It's a well known fact that maintenance engineers are though good engineers yet they need to be better managers for the effective realization of company's goals. Grand Quiz in Maintenance Management is offered as a Certification Course with a view to assess knowledge, skills and competence of maintenance engineers in core issues related to management of maintenance function.

□ Certification Course in Grand Quiz in Maintenance Management is a part of learning process and provides a great opportunity for maintenance engineers and managers to help them get assessed to know their level of awareness in maintenance management and what they need to learn further.

□ Quizzes provide numerous benefits and help motivate course candidates to work on various concepts and areas that remained untouched by them. Certification Course in Grand Quiz in Maintenance Management is structured with well crafted quizzes on different aspects of maintenance management. It paves way for judging one's own strengths & weaknesses and getting exposure to new things and ideas. The course has innovatively been designed to promote greater awareness and motivation amongst maintenance engineers and proves catalytic in creating all round awareness about maintenance management. The course offers invaluable insights for the need to improve maintenance practices in their plants.

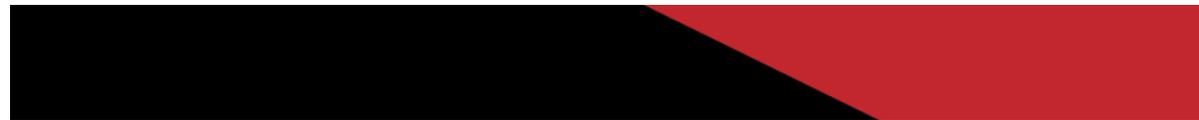
COURSE STRUCTURE AND COVERAGE

Certification Course in Grand Quiz in Maintenance Management is designed to include more than one thousand and five hundred objective type questions on various issues related to management of maintenance function in 24 sections, noted below:

- General Principles of Maintenance and Economical Aspects
- Maintenance Productivity, Wastage Reduction and Energy Conservation
- Basic and Broad Aspects of Maintenance Management – I
- Basic and Broad Aspects of Maintenance Management – II
- Tribology – Wear, Friction and Lubrication Aspects
- Maintenance Methods Improvement and Maintenance Time Standards
- Maintenance Techniques and Practices
- Lubrication Management

- Fixing Equipment Criticality / Priority
 - Maintenance Organizational Structure
 - Maintenance Planning and Scheduling
 - Planned Maintenance Systems and Procedures
 - Condition-based Maintenance
 - Maintenance Budgeting and Costing
 - Maintenance Performance Measurement and Analysis
 - Machine Reliability and Maintainability Improvement
 - Equipment Replacement and Investment Analysis
 - Machine Failure Analysis and Control
 - Machine Parts Rebuilding / Reconditioning
 - Value Analysis in Maintenance Functions
 - Role of Maintenance in Plant Safety
 - Spares Inventory Control
 - Creativity and Problem-solving Management
 - Total Productive Maintenance
- *EDP-V Assignments*

Assignments include 24 sets of different quizzes, each covering a large number of objective type questions.



REGISTRATION

For registration to one or more 'Distance Training Certification Executive Development Programmes' (EDP-I to EDP-V), please forward the completed Registration Form(s) for each of the selected courses separately to IMME by email.

**Institute of Maintenance
Management Education
39-D, Ayodhya Enclave
Rohini, Sector 13
Delhi – 110 085
INDIA**

Website: www.immeinstitute.org
Blog: www.maintenancemgmt.wordpress.com
Tel.: +91-11-35556795, 27866481
Fax: +91-11-27568553
E-mail: info@immeinstitute.org
immeinstitute@gmail.com

EXCELLENCE IN TRAINING FOR OVER 30 YEARS

CLIENTS

□ Tens of thousands of maintenance engineers, managers, plant executives and other engineering personnel from various reputed companies in the corporate sector have participated in different training programmes & courses, workshops and seminars conducted by IMME in a period of over 30 years.

□ Some of the companies who have participated in various training programmes & courses, workshops and seminars conducted by IMME in the past are shown below:

ABB Limited	Travancore Ltd., The	Orient Cement
Ador Welding Ltd.	Finolex Industries Ltd.	Orient Paper Mills
Alfa Laval (India) Ltd.	Gharda Chemicals Ltd.	Oriental Carbon & Chemicals Ltd.
Amaraja Batteries Ltd.	Godrej & Boyce Mfg. Co. Ltd.	PI Industries Ltd.
Ambuja Cements Ltd.	Goodyear India Limited	Panyam Cements & Mineral
Anshupati Textiles	Graphite India Limited	Industries Ltd.
(A Divn. of Vardhman Polytext Ltd.)	Grasim Industries Limited	Pasupati Acrylon Ltd.
Antifriction Bearings Corporation Ltd., The	Greaves Cotton Limited	Phillips India Ltd.
Ashok Leyland Ltd.	Gujarat Mineral Development	Poona Shims Pvt. Ltd.
Asian Cables & Industries Ltd.	Corporation Ltd.	Prakash Industries Ltd.
Asian Paints (India) Ltd.	Gujarat State Fertilizers Co. Ltd.	Pyrites, Phosphates & Chemicals Ltd.
Atul Limited	Hanon Climate Systems India Pvt. Ltd.	Radico Khaitan Ltd.
Bajaj Auto Ltd.	Hawkins Cookers Limited	(Unit: Rampur Distillery)
Balkrishna Industries Limited	Hindalco Industries Ltd.	Rajasthan State Co-operative
(Unit : Balkrishna Paper Mills)	(Renusagar Power)	Spg. & Gng. Mills Federation Ltd.
Balmer Lawrie & Co. Ltd.	Hindustan Aeronautics Limited	Ranbaxy Laboratories Ltd.
Bata India Limited	Hindustan Everest Tools Limited	Rane Brake Linings Ltd.
Bellary Steels & Alloys Ltd.	Hindustan Fertilizer Corporation Limited	Rashtriya Chemicals & Fertilizers Ltd.
Bharat Aluminium Co. Ltd.	Hindustan Unilever Limited	Raymond Limited
Bharat Dynamics Ltd.	Hindustan Newsprint Limited	Reckitt Benckiser (India) Ltd.
Bharat Electronics Ltd.	Hindustan Organic Chemicals Ltd.	Reliance Industries Ltd.
Bharat Heavy Electricals Ltd.	Hindustan Petroleum Corporation Ltd.	Robo Silicon Private Limited
Bharat Petroleum Corporation Ltd.	Hindustan Wires Limited	SRF Limited
Bharat Refractories Ltd.	ITC Limited	Samcor Glass Limited
Bhuruka Gases Limited	ITI Limited	Samtel Color Limited
Birla Cement Works	India Glycols Ltd.	Saraswati Sugar Mills, The
Blue Star Limited	India Pistons Limited	Shiram Pistons and Rings Ltd.
Bombay Dyeing & Mfg. Co. Ltd., The	Indian Farmers Fertilizer	Siemens Ltd.
Borosil Glass Works Ltd.	Co-operative Ltd.	Simbhaoli Sugar Mills Ltd., The
Brakes India Limited	Indian Oil Corporation Ltd.	Sona Steering Systems Ltd.
Bridge and Roof Co. (India) Ltd.	Indian Ordnance Factories	Steel Authority of India Ltd.
Britannia Industries Ltd.	Integral Coach Factory	Stumpp, Shuele & Somappa Springs Pvt.
Cable Corporation of India Ltd.	Jubilant Life Sciences Ltd.	Ltd.
Carborundum Universal Ltd.	Kalyani Steels Ltd.	Sudarshan Chemical Industries Ltd.
Castrol India Limited	Karnataka Antibiotics &	Sunflag Iron & Steel Co. Ltd.
Ceat Limited	Pharmaceuticals Ltd.	TVS Motor Company Ltd.
Central Electronics Limited	Kirloskar Brothers Limited	Tamilnadu Petroproducts Ltd.
Cetex Petrochemicals Limited	Kirloskar Copeland Limited	Tata Chemicals Limited
Chennai Petroleum Corpn. Ltd.	Kirloskar Electric Company Ltd.	Tata Power Company Ltd.
Chittaranjan Locomotive Works	Kirloskar Oil Engines Ltd.	Tata Motors Ltd.
Cipla Limited	Kirloskar Pneumatic Co. Ltd.	Tata Steel Ltd.
Coal India Limited	Lakshmi Electrical Control Systems Ltd.	Technova Imaging Systems (P) Ltd.
Colgate-Palmolive (India) Ltd.	Larsen & Toubro Limited	Thermax Limited
Continental Device India Ltd.	Lubrizol India Pvt. Ltd.	Titan Industries Limited
Coromandel Fertilizers Ltd.	Lupin Limited	Traco Cable Company Limited
Cosmo Ferrites Limited	MRF Limited	Tractors and Farm Equipment Ltd.
Cosmo Films Limited	Maharashtra Seamless Limited	Travancore Titanium Products Limited
Crompton Greaves Limited	Mahindra & Mahindra Ltd.	U.P. Twiga Fibreglass Ltd.
Cuffast Abrasive Tools Ltd.	Malayala Manorama Co. Ltd.	USV Limited
DCM Textiles	Malwa Cotton Mills Ltd.	United Phosphorous Ltd.
Dabur India Limited	Manali Petrochemical Ltd.	Usha Martin Ltd.
Deepak Fertilisers and Petrochemicals	Mark Auto Industries Ltd.	V.I.P. Industries Ltd.
Corporation Ltd.	Mineral Exploration Corporation Ltd.	Vadilal Industries Ltd.
Deepak Nitrite Limited	Mother Dairy	Varun Beverages Limited
Denso India Ltd.	Mysore Paper Mills Ltd., The	Videcon Appliances Ltd.
Dhampur Sugar Mills Ltd., The	NTPC Limited	Vikram Cement
Dharamsi Morarji Chemical Co. Ltd., The	Nagarjuna Fertilizers and Chemicals Ltd.	Vindhya Telelinks Ltd.
E.I.D. Parry (India) Ltd.	National Aluminium Company Ltd.	Voltas Limited
Eicher Tractors	National Engineering Industries Ltd.	Walchandnagar Industries Limited
Emco Transformers Ltd.	National Fertilizers Limited	Welspun Corp Ltd.
Escorts Limited	National Steel Industries Ltd.	Wipro Limited
Ester Industries Limited	Neyveli Lignite Corporation Ltd.	Wockhardt Limited
Eveready Industries India Ltd.	Nuclear Fuel Complex	Zenith Chemicals
Fertilizers and Chemicals	Nuclear Power Corporation of India Ltd.	(A Divn. of Zenith Ltd.)