Training Course on Airport Pavement Management and Maintenance

Professional Development Training Course Outline

Category	Aviation and Airport Management	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Efficient **Airport Pavement Management (APM)** and **Maintenance (APM&M)** are critical for ensuring **aviation safety**, operational continuity, and long-term infrastructure sustainability. Modern airports face increasing challenges, including heavier aircraft loads, extreme weather conditions, and the imperative for cost-effective asset management. This comprehensive training program provides aviation professionals with the **latest industry best practices**, **cutting-edge technologies**, and **strategic approaches** to effectively manage and maintain airport pavements, minimizing downtime and optimizing financial resources.

Training Course on Airport Pavement Management and Maintenance emphasizes the integration of **data-driven decision-making**, **advanced inspection techniques**, and **sustainable pavement solutions**. Participants will gain practical skills in implementing **Pavement Management Systems (PMS)**, conducting accurate **Pavement Condition Index (PCI) assessments**, and developing robust **maintenance and rehabilitation (M&R) strategies**. By mastering these essential competencies, attendees will contribute significantly to the **operational efficiency**, **safety compliance**, and **economic viability** of their respective airport facilities in an increasingly complex and demanding aviation landscape.

Programme Curriculum

Training Course on Airport Pavement Management and Maintenance

Introduction

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Course Objectives

1. Implement and leverage **advanced PMS software** for data-driven decision-making in **airport infrastructure management**.
2. Perform accurate **ASTM D5340 PCI assessments** and interpret results for effective **pavement deterioration modeling**.
3. Identify and apply **eco-friendly materials** and **green construction techniques** for **resilient airport pavements**.
4. Formulate **cost-effective M&R plans** considering **lifecycle cost analysis** and **long-term pavement performance**.
5. Utilize **GIS for pavement inventory management** and **visual data analysis** to enhance spatial decision-making.
6. Implement **GPR (Ground Penetrating Radar)** and other **NDT techniques** for comprehensive pavement evaluation.
7. Analyze the impact of **heavy aircraft loads** and **traffic patterns** on pavement distress and design.
8. Implement strategies for effective **runway friction management** and ensure **aircraft braking performance**.
9. Develop robust **FOD prevention programs** related to pavement conditions.
10. Explore the application of **artificial intelligence** and **machine learning algorithms** for **predictive maintenance** and **automated defect detection**.
11. Adhere to **ICAO (International Civil Aviation Organization)**, **FAA (Federal Aviation Administration)**, and local **aviation authority** regulations for airport pavement.
12. Develop **strategic budget models** for **pavement asset management** and prioritize **infrastructure investments**.
13. Design and maintain pavements considering the impacts of **climate change**, including **extreme temperatures** and **increased precipitation**.

Organizational Benefits

- Proactive pavement maintenance reduces the risk of **Foreign Object Debris (FOD)** and ensures optimal **runway friction**, directly improving aircraft safety.
- Implementing effective **Pavement Management Systems (PMS)** extends pavement lifespan, deferring costly major rehabilitations.

- Strategic **maintenance and rehabilitation (M&R) planning** reduces emergency repairs and minimizes long-term operational expenditures.
- Reduced runway closures and disruptions due to efficient pavement management lead to smoother airport operations and minimized flight delays.
- Adherence to international and national aviation standards (e.g., **ICAO, FAA**) mitigates legal and financial penalties.
- Empowering staff with the skills to analyze pavement data leads to more informed and effective infrastructure investment decisions.
- Adoption of **green pavement technologies** and practices contributes to environmental responsibility and reduced carbon footprint.
- Well-maintained pavements support increased air traffic and enhance the airport's ability to withstand environmental stressors.

Target Audience

1. Airport Civil Engineers.
2. Airport Operations Managers
3. Pavement Maintenance Technicians
4. Infrastructure Planners
5. Consultants and Contractors
6. Aviation Authority Inspectors/Regulators.
7. Facility Managers
8. Project Managers.

Course Outline

Module 1: Introduction to Airport Pavement Systems

- Types of Airport Pavements: Flexible (Asphalt) and Rigid (Concrete)
- Key Components and Layer Functions
- Distinction between Airport and Road Pavements
- Regulatory Framework: ICAO Annex 14, FAA ACs, EASA
- **Case Study:** Analysis of pavement types at a major international hub (e.g., Dubai International Airport) and their design considerations.

Module 2: Pavement Deterioration and Distress Mechanisms

- Common Pavement Distresses: Cracking, Rutting, Spalling, Faulting
- Factors Influencing Deterioration: Traffic Load, Environment, Materials, Construction Quality
- Impact of Distress on Pavement Performance and Safety
- Overview of Distress Severity and Extent
- **Case Study:** Identifying and categorizing distresses on a regional airport's runway, leading to targeted maintenance strategies.

Module 3: Pavement Condition Assessment and PCI Surveys

- Principles of Visual Pavement Inspection
- ASTM D5340 Standard for Pavement Condition Index (PCI)
- Data Collection Methodology and Equipment
- Calculation and Interpretation of PCI Values

- **Case Study:** Conducting a mock PCI survey on a simulated airfield section and calculating the PCI score for a real-world scenario.

Module 4: Introduction to Pavement Management Systems (PMS)

- Components of a Comprehensive PMS: Inventory, Condition Data, M&R History, Traffic Data
- Benefits of Implementing a PMS: Cost-Effectiveness, Optimization, Prioritization
- Popular PMS Software: PAVER, MicroPAVER, etc.
- Data Integration and Database Management
- **Case Study:** Exploring the implementation of a PMS at a medium-sized airport, highlighting its impact on budget allocation.

Module 5: Pavement Maintenance Strategies

- Routine Maintenance Activities: Crack Sealing, Joint Sealing, Patching
- Preventative Maintenance: Surface Treatments (Slurry Seals, Fog Seals, Chip Seals)
- Corrective Maintenance: Partial/Full Depth Repair
- Maintenance Frequencies and Scheduling
- **Case Study:** Evaluating the effectiveness of different preventive maintenance treatments on a taxiway section over a 5-year period.

Module 6: Pavement Rehabilitation Techniques

- Types of Rehabilitation: Overlays (Asphalt, Concrete), Recycling, Reconstruction
- Factors Influencing Rehabilitation Decisions: Pavement Condition, Traffic, Budget
- Design Considerations for Overlays and Reconstruction
- Material Selection for Rehabilitation
- **Case Study:** A comprehensive rehabilitation project at a busy airport involving unbonded concrete overlay on an existing asphalt runway.

Module 7: Pavement Design Fundamentals

- Basic Principles of Flexible and Rigid Pavement Design
- Aircraft Loading Characteristics and Their Impact
- Subgrade Characterization and Testing
- Drainage Design for Airport Pavements
- **Case Study:** Review of a new runway design, focusing on load distribution and material specifications.

Module 8: Airport Pavement Construction and Quality Control

- Construction Stages for Flexible and Rigid Pavements
- Material Specifications and Quality Assurance/Control
- Compaction and Paving Techniques
- Jointing and Curing Practices for Concrete Pavements
- **Case Study:** Analyzing quality control issues during a recent runway extension project and their subsequent rectification.

Module 9: Advanced Pavement Testing and Evaluation

- Non-Destructive Testing (NDT): Falling Weight Deflectometer (FWD), Ground Penetrating Radar (GPR)
- Destructive Testing: Core Sampling, Plate Bearing Tests
- Friction Measurement: Continuous Friction Measuring Equipment (CFME)

- Roughness Measurement and International Roughness Index (IRI)
- **Case Study:** Using FWD data to assess the structural integrity of a deteriorating apron section.

Module 10: Foreign Object Debris (FOD) Management from Pavements

- Sources of Pavement-Generated FOD
- FOD Prevention Strategies: Regular Sweeping, Pavement Repair
- FOD Detection Technologies
- Impact of FOD on Aircraft Safety and Operations
- **Case Study:** An airport's successful FOD reduction program attributed to improved pavement maintenance practices.

Module 11: Airport Pavement Markings and Lighting

- Importance of Clear and Compliant Pavement Markings
- Types of Markings: Runway, Taxiway, Apron
- Application Techniques and Materials for Markings
- Integration with Airfield Ground Lighting (AGL) Systems
- **Case Study:** Upgrading runway markings and integrating them with LED AGL for enhanced visibility and compliance.

Module 1 2: Sustainable and Resilient Pavement Solutions

- Green Materials: Recycled Asphalt Pavement (RAP), Recycled Concrete Aggregate (RCA)
- Warm Mix Asphalt (WMA) and other Energy-Saving Techniques
- Permeable Pavements for Stormwater Management
- Climate Change Adaptation in Pavement Design and Maintenance
- **Case Study:** Implementation of recycled materials in a taxiway reconstruction project, demonstrating environmental and cost benefits.

Module 13: Budgeting and Financial Planning for Pavement Management

- Lifecycle Cost Analysis (LCCA) for Pavement Investments
- Developing Annual and Multi-Year Pavement Budgets
- Prioritization of Maintenance and Rehabilitation Projects
- Funding Sources for Airport Pavement Projects
- **Case Study:** Strategic budgeting for a large airport's 10-year pavement capital improvement plan.

Module 14: Emerging Technologies in Airport Pavement Management

- **Artificial Intelligence (AI)** and **Machine Learning (ML)** for Predictive Maintenance
- **Drone-Based Inspections** and **Automated Defect Detection**
- **Digital Twins** for Real-time Pavement Monitoring
- **Sensor Technologies** for Pavement Performance Monitoring
- **Case Study:** An airport's pilot program utilizing AI for automated crack detection and analysis.

Module 15: Best Practices, Case Studies, and Future Trends

- Review of Global Best Practices in APM&M
- Discussion of Complex Pavement Challenges and Solutions
- Future Trends: Autonomous Inspection, Smart Pavements, Advanced Materials
- Interactive Problem-Solving Sessions

- **Case Study:** Comprehensive review of a challenging pavement project (e.g., pavement construction on soft soils or in extreme climates) and lessons learned.

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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