Training course on Sustainable Pavement Design and Management

Professional Development Training Course Outline

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

Course Introduction

Pavement infrastructure, a critical component of transportation networks, facilitates economic activity and societal connectivity. However, the conventional methods of pavement design, construction, and maintenance are inherently resource-intensive, consuming vast quantities of virgin materials, energy, and contributing significantly to greenhouse gas emissions and waste generation. As the global imperative for sustainability intensifies, there is an urgent need for the transportation sector to adopt practices that minimize environmental impact while ensuring long-term performance and resilience. This paradigm shift towards sustainable pavement design and management is crucial for reducing the carbon footprint of transportation infrastructure, conserving natural resources, and fostering a more circular economy within the civil engineering domain. Understanding the principles of life cycle assessment, material circularity, and energy efficiency is paramount for developing pavement solutions that meet current mobility needs without compromising the ability of future generations to meet their own. Training Course on Sustainable Pavement Design and Management is meticulously designed to equip civil engineering, transportation planning, and infrastructure management professionals with the advanced knowledge and practical skills required to integrate sustainability principles into every phase of pavement projects. Participants will gain a comprehensive understanding of sustainable pavement materials, including recycled aggregates, warm mix asphalt, and bio-binders, and learn to evaluate their environmental and economic performance. The curriculum will delve into cutting-edge design methodologies that optimize material use and enhance durability, as well as innovative construction practices that reduce energy consumption and waste generation. Through a blend of theoretical instruction, hands-on design exercises, and in-depth case studies of successful sustainable pavement projects globally, attendees will develop the expertise to conduct life cycle assessments, formulate sustainable pavement management plans, and navigate the complex regulatory and financing landscapes associated with green infrastructure. This course is indispensable for professionals committed to building more environmentally responsible, resilient, and cost-effective transportation networks.

Programme Curriculum

Training Course on Sustainable Pavement Design and Management

Introduction

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Course Objectives

Upon completion of this course, participants will be able to:

1. Understand the environmental impacts of conventional pavement design and construction.
2. Apply principles of Life Cycle Assessment (LCA) to evaluate the sustainability of pavement options.
3. Identify and select sustainable pavement materials, including recycled and alternative binders.
4. Design pavements incorporating recycled asphalt pavement (RAP) and recycled concrete aggregate (RCA).
5. Explore the benefits and applications of Warm Mix Asphalt (WMA) and other low-energy mixes.
6. Understand the principles of perpetual pavements and long-life design for enhanced durability.
7. Develop strategies for optimizing pavement construction processes to reduce emissions and waste.
8. Implement sustainable pavement management practices for maintenance and rehabilitation.
9. Evaluate the economic viability and life cycle costs of sustainable pavement solutions.
10. Navigate relevant policies, standards, and certifications for sustainable pavements.
11. Utilize software tools for pavement design, LCA, and performance modeling.

12. Analyze case studies of successful sustainable pavement projects globally.
13. Drive the adoption of sustainable pavement practices within their organizations and projects.

Target Audience

This course is essential for professionals seeking to implement sustainable pavement design and management:

1. Civil Engineers: Specializing in pavement design, construction, and materials.
2. Transportation Planners: Developing sustainable transportation infrastructure.
3. Pavement Engineers: Focusing on material science, performance, and management.
4. Infrastructure Managers: Responsible for maintaining and rehabilitating road networks.
5. Environmental Consultants: Advising on sustainability in transportation projects.
6. Government Officials: From public works and transport agencies.
7. Material Suppliers & Manufacturers: Developing sustainable pavement products.
8. Researchers & Academics: Studying pavement engineering and sustainability.

Course Duration

10 Days

Course Modules

Module 1: Introduction to Sustainable Pavements

- Define sustainable pavements and their importance in the transportation sector.
- Analyze the environmental footprint of conventional pavement materials and construction.
- Discuss the principles of circular economy applied to pavement infrastructure.
- Explore the drivers for sustainable pavement adoption: environmental, economic, social.
- Overview of global trends and initiatives in green pavement development.

Module 2: Life Cycle Assessment (LCA) for Pavements

- Understand the methodology of LCA specifically for pavement systems.
- Learn to define the scope, functional unit, and system boundaries for pavement LCA.
- Discuss data collection for life cycle inventory (LCI) of pavement materials and processes.
- Apply Life Cycle Impact Assessment (LCIA) methods relevant to pavements.
- Interpret LCA results to identify environmental hotspots and inform decision-making.

Module 3: Recycled Asphalt Pavement (RAP) and Recycled Asphalt Shingles (RAS)

- Understand the properties and benefits of using RAP in new asphalt mixes.
- Discuss different RAP incorporation techniques: hot recycling, cold recycling, full-depth reclamation.
- Explore the use of Recycled Asphalt Shingles (RAS) in pavement applications.
- Learn about quality control and mix design considerations for RAP/RAS mixes.
- Analyze case studies of high RAP/RAS content pavements.

Module 4: Recycled Concrete Aggregate (RCA) in Pavements

- Define Recycled Concrete Aggregate (RCA) and its production process.
- Discuss the application of RCA in concrete pavements, base, and subbase layers.
- Understand the properties of RCA and its impact on pavement performance.
- Explore mix design considerations for concrete incorporating RCA.
- Examine the environmental benefits of diverting concrete waste to RCA.

Module 5: Warm Mix Asphalt (WMA) and Other Low-Energy Mixes

- Understand the principles and benefits of Warm Mix Asphalt (WMA) technologies.
- Discuss different WMA production methods (foaming, chemical additives, organic additives).
- Explore the energy savings and emission reductions associated with WMA.
- Learn about half-warm and cold mix asphalt technologies.
- Analyze the performance and durability of WMA in various climates.

Module 6: Bio-Binders and Alternative Binders

- Explore the use of bio-binders derived from renewable resources (e.g., lignin, vegetable oils).
- Discuss the properties and performance of bio-binders in asphalt mixes.
- Understand the potential of recycled plastics and other waste materials as asphalt modifiers.
- Examine sulfur-extended asphalt and other alternative binding agents.
- Analyze the environmental benefits and challenges of alternative binders.

Module 7: Perpetual Pavements and Long-Life Design

- Define perpetual pavements and their design philosophy for extended service life.
- Discuss the concept of multi-layered pavement structures for durability.
- Explore materials and construction techniques for long-life pavements.
- Understand the economic and environmental benefits of reduced maintenance and rehabilitation.
- Analyze case studies of perpetual pavement implementation.

Module 8: Sustainable Pavement Construction Practices

- Implement energy-efficient construction equipment and practices.
- Discuss strategies for reducing fuel consumption and emissions on site.
- Explore optimized hauling routes and logistics for material transport.
- Learn about waste minimization and on-site recycling during construction.
- Understand the role of quality control and compaction in long-term performance.

Module 9: Sustainable Pavement Management and Maintenance

- Develop sustainable pavement management systems (PMS) for optimized rehabilitation.
- Discuss life cycle cost analysis (LCCA) for maintenance and rehabilitation decisions.
- Explore sustainable maintenance techniques (e.g., crack sealing, thin overlays).
- Understand the role of pavement preservation in extending service life.
- Analyze the environmental impacts of different maintenance strategies.

Module 10: Urban Heat Island Mitigation and Pavement Permeability

- Understand the urban heat island (UHI) effect and the role of pavements.
- Explore cool pavement technologies (e.g., reflective coatings, pervious pavements).
- Discuss the design and benefits of permeable pavements for stormwater management.
- Learn about the use of porous asphalt and pervious concrete.
- Analyze the co-benefits of permeable pavements for water quality and groundwater recharge.

Module 11: Policies, Standards, and Certifications for Sustainable Pavements

- Review national and international policies promoting sustainable pavement construction.
- Discuss relevant industry standards and specifications for recycled and alternative materials.

- Explore green infrastructure certifications and their relevance to pavements.
- Understand environmental product declarations (EPDs) for pavement materials.
- Analyze the role of public procurement in driving demand for sustainable pavements.

Module 12: Case Studies and Future Trends in Sustainable Pavements

- Analyze successful global case studies of sustainable pavement design and management.
- Discuss emerging technologies: self-healing pavements, energy-harvesting pavements, smart pavements.
- Explore the role of digital twins and AI in optimizing pavement performance and sustainability.
- Examine the potential of nanotechnology in enhancing pavement properties.
- Identify future challenges and opportunities for pavement engineering in a circular economy.

Training Methodology

- **Interactive Workshops:** Facilitated discussions, group exercises, and problem-solving activities.
- **Case Studies:** Real-world examples to illustrate successful community-based surveillance practices.
- **Role-Playing and Simulations:** Practice engaging communities in surveillance activities.
- **Expert Presentations:** Insights from experienced public health professionals and community leaders.
- **Group Projects:** Collaborative development of community surveillance plans.
- **Action Planning:** Development of personalized action plans for implementing community-based surveillance.
- **Digital Tools and Resources:** Utilization of online platforms for collaboration and learning.
- **Peer-to-Peer Learning:** Sharing experiences and insights on community engagement.
- **Post-Training Support:** Access to online forums, mentorship, and continued learning resources.

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

- Participants must be conversant in English.
- Upon completion of training, participants will receive an Authorized Training Certificate.
- The course duration is flexible and can be modified to fit any number of days.
- Course fee includes facilitation, training materials, 2 coffee breaks, buffet lunch, and a Certificate upon successful completion.
- One-year post-training support, consultation, and coaching provided after the course.
- Payment should be made at least a week before the training commencement to Fineskill Training Center account, as indicated in the invoice, to enable better preparation.

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
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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