Training course on Carbon Footprint Reduction in Construction Projects

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

The construction industry is a significant contributor to global greenhouse gas emissions, primarily through the production of materials like cement and steel, energy consumption during construction, and waste generation. As the world confronts the urgent challenge of climate change, there is an escalating demand for the built environment sector to drastically reduce its carbon footprint. This necessitates a fundamental shift in how construction projects are planned, designed, executed, and managed, embracing innovative strategies and technologies that prioritize decarbonization. Understanding the sources of emissions and implementing effective mitigation measures across the entire project lifecycle is no longer an option but a critical imperative for environmental stewardship, regulatory compliance, and market competitiveness. Training Course on Carbon Footprint Reduction in Construction Projects is meticulously designed to equip civil engineering, construction management, and sustainability professionals with the advanced knowledge and practical skills required to identify, quantify, and significantly reduce the carbon footprint of diverse construction projects. Participants will gain a comprehensive understanding of carbon accounting methodologies, life cycle assessment (LCA) for embodied carbon, and operational energy efficiency strategies. The curriculum will delve into cutting-edge approaches such as low-carbon material selection, optimized construction processes, renewable energy integration on site, and advanced waste management techniques aimed at circularity. Through a blend of theoretical instruction, hands-on exercises, and in-depth case studies of real-world decarbonization efforts, attendees will develop the expertise to conduct carbon audits, implement carbon reduction plans, and navigate the evolving landscape of green building standards and carbon regulations. This course is indispensable for engineers, project managers, environmental consultants, and policy makers committed to driving sustainable practices in construction. By mastering the principles and practices of carbon footprint reduction, professionals can lead their organizations towards a more environmentally responsible future, contributing directly to global climate targets and fostering a truly sustainable built environment.

Programme Curriculum

Training Course on Carbon Footprint Reduction in Construction Projects

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Course Objectives

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

1. Understand the major sources of carbon emissions in construction projects.
2. Apply methodologies for quantifying embodied carbon in construction materials and processes.
3. Conduct carbon footprint assessments for different types of infrastructure and building projects.
4. Identify and select low-carbon and sustainable materials to reduce embodied carbon.
5. Develop strategies for optimizing construction processes to minimize on-site emissions.
6. Integrate renewable energy solutions for temporary power and operational energy needs.
7. Implement effective construction and demolition waste management strategies for carbon reduction.
8. Evaluate the role of digital tools and technologies in monitoring and reducing carbon footprints.
9. Formulate comprehensive carbon reduction plans for construction projects.
10. Understand the policy, regulatory, and financial mechanisms supporting decarbonization in construction.
11. Communicate carbon reduction strategies and their benefits to project stakeholders.
12. Analyze case studies of successful carbon reduction initiatives in construction worldwide.
13. Drive organizational change towards a lower-carbon construction practice.

Target Audience

This course is essential for professionals seeking to reduce the carbon footprint of construction projects:

1. Civil Engineers: Involved in design, construction, and project management.
2. Construction Managers: Overseeing project execution and site operations.
3. Sustainability Consultants: Advising on environmental performance and carbon management.
4. Environmental Engineers: Specializing in emissions reduction and waste management.
5. Project Developers: Seeking to implement low-carbon construction practices.
6. Government Officials: Responsible for public procurement and green infrastructure policies.
7. Architects & Structural Engineers: Integrating low-carbon design and materials.
8. Quantity Surveyors & Cost Estimators: Valuing sustainable material alternatives.

Course Duration

10 Days

Course Modules

Module 1: Understanding Carbon Emissions in Construction

- Define carbon footprint and greenhouse gases (GHGs) relevant to construction.
- Identify direct and indirect emission sources across the construction project lifecycle.
- Explore the concept of embodied carbon vs. operational carbon in buildings and infrastructure.
- Discuss global and national targets for decarbonization in the built environment.
- Overview of the urgency and impact of climate change on the construction sector.

Module 2: Carbon Accounting and Measurement Methodologies

- Learn principles of carbon accounting and relevant international standards (e.g., GHG Protocol).
- Master methodologies for calculating embodied carbon of materials using EPDs and databases.
- Understand techniques for quantifying operational carbon from energy consumption.
- Discuss the challenges and limitations of carbon data collection and accuracy.
- Apply basic carbon calculation exercises for construction components.

Module 3: Low-Carbon Concrete and Cement Alternatives

- Explore the carbon intensity of traditional cement production.
- Identify and evaluate supplementary cementitious materials (SCMs) for concrete.
- Discuss geopolymers and alkali-activated materials as cement-free binders.
- Understand the use of recycled concrete aggregates (RCA) in low-carbon mixes.
- Examine innovative concrete technologies for carbon capture and storage.

Module 4: Sustainable Steel and Other Metals for Decarbonization

- Analyze the carbon footprint of virgin steel production.
- Discuss the role of electric arc furnaces (EAF) and recycled steel in reducing emissions.
- Explore alternative metals and alloys with lower embodied carbon.
- Understand design strategies for optimizing steel use and minimizing waste.
- Examine the potential of green hydrogen in future steel production.

Module 5: Timber and Bio-Based Materials for Carbon Sequestration

- Understand the carbon sequestration potential of timber and engineered wood products.
- Explore the use of bamboo and other fast-growing bio-based materials.
- Discuss the life cycle impacts of timber harvesting and processing.
- Examine bio-adhesives and natural insulation materials.
- Analyze the benefits of hybrid timber-concrete construction systems.

Module 6: Energy Efficiency in Construction Operations

- Identify energy consumption hotspots on construction sites (e.g., machinery, temporary facilities).
- Develop strategies for optimizing equipment use and fuel efficiency.
- Explore the use of renewable energy (solar PV, battery storage) for site power.
- Discuss energy-efficient temporary structures and site lighting.
- Implement monitoring and reporting systems for on-site energy use.

Module 7: Construction and Demolition Waste (CDW) for Carbon Reduction

- Understand the carbon emissions associated with CDW disposal in landfills.
- Develop strategies for waste prevention, reduction, and reuse on site.
- Explore advanced recycling technologies for various CDW streams.
- Discuss the valorization of waste materials into new construction products.
- Analyze the economic and environmental benefits of circular waste management.

Module 8: Design Optimization for Carbon Reduction

- Learn principles of passive design for reducing operational energy demand.
- Discuss material efficiency strategies through optimized structural design.
- Explore modular construction and prefabrication for reduced waste and emissions.
- Understand the role of Building Information Modeling (BIM) in material optimization.
- Apply design for deconstruction principles to facilitate future reuse.

Module 9: Carbon Offsetting and Insetting Strategies

- Define carbon offsetting and its role in achieving net-zero targets.
- Explore different types of carbon credits and their verification processes.
- Discuss the concept of carbon insetting within the construction supply chain.
- Understand the limitations and ethical considerations of carbon offsetting.
- Formulate a balanced approach combining direct reduction with offsetting/insetting.

Module 10: Policy, Regulations, and Financial Incentives for Decarbonization

- Review national and international policies targeting carbon emissions in construction.
- Understand carbon pricing mechanisms and emissions trading schemes.
- Discuss green building codes, standards, and carbon reporting requirements.
- Explore financial incentives, grants, and green loans for low-carbon projects.
- Analyze the role of public procurement in driving decarbonization.

Module 11: Digital Tools and Technologies for Carbon Management

- Explore carbon calculation software and LCA tools for construction projects.
- Discuss the use of BIM for embodied carbon calculation and material tracking.
- Understand the application of AI and machine learning in optimizing carbon performance.
- Examine blockchain for supply chain transparency and carbon verification.

- Learn about real-time monitoring systems for operational energy and emissions.

Module 12: Case Studies and Future of Carbon Reduction in Construction

- Analyze successful global case studies of net-zero and low-carbon construction projects.
- Discuss emerging technologies and research in carbon-negative materials.
- Explore the concept of regenerative construction and its carbon implications.
- Examine the role of circular economy principles in achieving deep decarbonization.
- Identify future challenges and opportunities for the construction industry in a carbon-constrained world.

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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