



भारतीय प्रौद्योगिकी संस्थान भुवनेश्वर  
Indian Institute of Technology Bhubaneswar

Press Release

**Innovative Urban Solutions**

**IIT Bhubaneswar Develops Pervious Concrete Pavements to Combat Urban Flooding and Heat Islands**

**Bhubaneswar, 8<sup>th</sup> July 2024:** Rapid urbanization in India has led to widespread construction of impervious pavements like bituminous and concrete surfaces. These exacerbate stormwater runoff during rainfall, causing flood-like conditions in many cities. Additionally, increased impervious surfaces and urban population have significantly depleted groundwater reserves, impacting urban dwellers' quality of life. Recognizing that urban spaces like parking lots, cycle tracks, and pedestrian walkways do not need impervious pavements due to light traffic, researchers at the Indian Institute of Technology (IIT) Bhubaneswar developed a solution: pervious concrete pavements. This innovation aims to mitigate stormwater runoff and promote groundwater recharge.

Pervious concrete pavements provide a novel solution to these challenges. Unlike traditional pavements, pervious concrete features interconnected voids with at least 15% porosity, allowing stormwater to infiltrate through the pavement and recharge the groundwater. This reduces runoff, mitigates urban flooding, and is particularly suitable for areas such as parking lots, cycle tracks, and pedestrian walkways.

The School of Infrastructure at IIT Bhubaneswar recently implemented pervious concrete pavements in the cycle parking area, covering 150 square meters with 18 slabs. Students from the Transportation Engineering Section participated, placing 150 mm thick pervious concrete slabs, 3.5 by 2.5 meters, over a 250–300 mm reservoir layer atop the subgrade. The system can store over 20 cubic meters of water without runoff. Pervious concrete, produced at a ready-mix concrete (RMC) plant, facilitates stormwater infiltration, promoting percolation into the subgrade and aiding groundwater recharge.

To assess pervious concrete pavements' efficiency, rainfall data of June 27, 2024, was obtained from the GMAG lab of the School of Earth, Ocean, and Climate Sciences. The pavement infiltrated 6.8 cubic meters of stormwater per hour during 47.24 mm/hr rainfall from 1:30 pm to 4:00 pm without any runoff.

Dr. Anush K. Chandrappa, a faculty member from the School of Infrastructure, along with his students, conducted extensive research on the benefits of pervious concrete pavements. Their findings demonstrate that these pavements not only reduce runoff but also mitigate urban heat island (UHI) effects due to their increased porosity and latent heat flux. During the summer season at IIT Bhubaneswar, the surface temperature of bituminous pavement was approximately 20°C higher than that of pervious concrete pavement, significantly contributing to the urban heat island phenomenon. The project received extensive support from Prof. Sumanta Haldar, Head of the School of Infrastructure.

The implementation of pervious concrete pavements at IIT Bhubaneswar, supported by the engineering section of the institute, highlights the institution's commitment to sustainable infrastructure and sets a precedent for urban areas to follow. By reducing stormwater runoff and promoting groundwater recharge, this innovative approach addresses critical urban environmental issues and enhances the quality of life for city dwellers.

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→ Bituminous Pavements  
generating runoff due to  
impervious nature



→ Pervious concrete  
pavement infiltrating  
stormwater without  
runoff generation