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निर्माण सारिका

A Newsletter of BMTPC

निर्माण सामग्री एवं प्रोद्यौगिकी संवर्द्धन परिषद्
आवासन और शहरी कार्य मंत्रालय, भारत सरकार
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
Ministry of Housing & Urban Affairs, Government of India

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From the Desk of the Executive Director

At the onset of New Year 2025, BMTPC is bringing back its newsletter Nirman Sarika on alternate materials & construction technologies which are sustainable & have potential to be used in the field. With the launch of PMAY-U 2.0, we are committed to add 10 million housing stock in next five years. It is one of the largest affordable housing schemes in the world wherein all-weather houses are being provided to the EWS/LIG section of the society. PMAY-U 2.0 also incorporated Technology & Innovation Sub-Mission to propagate innovative construction technologies & alternate building materials, green buildings using passive design architecture and renewable resources, earthquake and other disaster resistant design and construction, thermally comfortable, climate smart buildings including simple concept of designs ensuring adequate sunlight and air & State or region-specific technologies and designs across the country. We are collaborating with academic institutions, research labs & other technical institutions including NGOs to facilitate widespread use of these innovations & creative processes. Successful implementation of Light House Projects & Demonstration Housing Projects under PMAY-U using globally available best construction technologies have paved the way for the stakeholders to adapt them for built environment so as to ensure quality living with affordability & sustainability.

Shailesh

(Dr. Shailesh Kr. Agrawal)

Published by:

Building Materials & Technology Promotion Council, New Delhi

Sensitization Programme on New Construction Technologies for Mass Housing at New Delhi

Shri Katikithala R Srinivas, Secretary, Ministry of Housing & Urban Affairs, Government of India inaugurating the Sensitization Programme

BMTPC in collaboration with the Indian Institute of Architects, Northern Chapter, organised Sensitization Programme on New Construction Technologies for Mass Housing, on Wednesday, the November 27, 2024 in New Delhi. The Sensitisation Programme was inaugurated by Shri Katikithala R Srinivas, Secretary, Ministry of Housing & Urban Affairs, Government of India. The event was organized to increase awareness amongst practicing architects with the latest advancements in construction technologies, crucial for addressing the future of India's Urbanization demands. The event commenced with an address by Dr. Shailesh Kr.Agrawal, Executive Director, BMTPC. He discussed the various initiatives taken up by the Central Government in the Housing sector and especially mentioned about the LightHouse Projects.

The Chief Guest, Shri Katikithala R Srinivas, Secretary, Ministry of Housing and Urban Affairs, GoI shared deep insights from his professional journey and discussed at length the urgent need for addressing the shortfalls in Urban Housing across the Country. He appealed to the Architects to think about our existing Cities with a fresh mind for addressing the issues of rising land costs leading to unaffordable costs of owning housing in our Cities.

Presentations on various innovative and emerging technologies and their case studies were made by Industry representatives from HoMission India Pvt. Ltd, B G Shirke Construction Technologies Pvt. Ltd., Magicrete Building Solutions Pvt. Ltd., Outinord Formwork Pvt. Ltd. Mitsumi Housing Pvt. Ltd. Skeleton Consultants and Larsen & Toubro Limited.

Emerging Technologies for Building Construction

Artificial Geopolymer Fly Ash Fine Aggregate (GFS)

NTPC with VNIT, Nagpur has developed Artificial Geopolymer Fly Ash Fine Aggregate (GFS). For the production of geopolymer fly ash sand (GFS), initially the laboratory scale production was carried out by mixing fly ash in the alkaline activator solution consisting of sodium hydroxide and sodium silicate. After the successful trial production of the GFS at laboratory scale, a pilot plant was setup at VNIT Nagpur from the funding provided by NTPC for the production of GFS at larger scale. Geopolymer fly ash sand is manufactured by addition of different molar concentration of sodium hydroxide and sodium silicate activator solution to the fly ash particles. The raw materials mixed thoroughly and granulated through a granulator to a desired size as per IS 383: 2016. The fly ash sand granules are then heated at a suitable temperature to provide curing and achieve the desired characteristics. NTPC is presently in the process of installation of a commercial plant of 10 Ton/Hour (50,000 Ton/Annum) for converting Flyash to sand at Sipat premises for its various applications as replacement of river sand in construction works.

Special feature of the product

i. Geopolymer Fine Flyash Aggregate (GFS) are artificial aggregates made from industrial waste like fly ash.
ii. The GFS is light in weight and meets the specifications to be used in concrete works.
iii. The GFS based concrete gains strength with passage of time. The durability characteristics of the concrete in terms of Rapid Chloride penetration, chloride migration & carbonation resistance are much better with use of GFS as replacement of river sand in concrete.
iv. With the production & use of GFS, already scarce natural resource (river sand) can be conserved.

Uses of Artificial Geopolymer Fly Ash Fine Aggregate

Construction works including plastering, mortar, concrete up to M25 Grade and other works/areas where river sand or crushed stone dust (crushed sand) is used.

Geopolymer Coarse Aggregate (GPCA)

The Geopolymer Coarse Aggregate (GPCA) has been developed by NTPC by primarily utilizing Fly Ash, an Industrial by-product, from coal based Thermal Power Plants (TPPs). The initial production & lab scale research work on these aggregates were conducted at NTPC Ramagundam. Apart from fly ash from ESP 2 nd field onwards from coal based TPPs, the other main ingredients for making GPCA include Sodium Hydroxide (NaOH) flakes, sodium silicate (Na2Sio3) liquid and water. The designed proportions of all the raw materials are thoroughly mixed & transferred to roller compressed machine to produce aggregates. After the trial production, a pilot project of 20MT/Day capacity has been installed at NTPC Sipat to manufacture GPCA for its various applications as alternate to natural stone aggregate. The use of this aggregate can help in sustainable development of construction industry through use of Industrial byproduct with proportionate conservation of natural stone aggregate resources.

Special features of the product

i. Geopolymer coarse aggregates are artificial aggregates made from industrial waste as fly ash.
ii. The aggregate is light in weight and meet the specifications to be used in concrete works.
iii. Being light in weight material handling is easy compared to natural stone aggregate.
iv. Self-weight of RCC structures will reduce with the usage of GPCA, resulting in the reduction in cost of construction.
v. No need of any stone quarrying required for the production of GPCA, conserving the already scarce natural resource.
vi. Manufacturing of GPCA does not require water for curing.

Uses of Geopolymer Coarse Aggregate (GPCA)

i. In Plain & Reinforced concrete components of the building
ii. Pre-cast concrete components such as Interlocking Paver Blocks, Wall panels, etc.
iii. Road construction & repair works, and use in sub-base course in road works
iv. It results in reduction of dead load of concrete structure. Handling of material is easy due to its lower bulk density.

Visit of Shri Katikithala R Srinivas, Secretary, Ministry of Housing and Urban Affairs, Govt. of India along with ED, BMTPC to CSIR-CBRI Roorkee

Shri Katikithala R Srinivas, Secretary, Ministry of Housing and Urban Affairs, Govt. of India, visited the CSIR-Central Building Research Institute (CBRI), Roorkee on November 24, 2024 and inaugurated state-of-the-art facilities viz. (i) The National Earthquake Engineering Test Facility (NEETF) and (ii) 3D Printed Concrete Building Facility, in the gracious presence of Dr. Shailesh Kr. Agrawal, Executive Director, BMTPC and Dr. R Pradeep Kumar, Director CSIR-CBRI. These facilities are monumental in advancing research and technology in the construction sector in India.

The National Earthquake Engineering Test Facility (NEETF) is India's premier platform for full-scale seismic performance testing of buildings up to four stories tall. It enables the rigorous evaluation of innovative construction technologies, ensuring compliance with earthquake safety standards and fostering superior seismic resilience.

CSIR-CBRI established state-of-the-art and unique "3D Printed Concrete Building (3DPC)" facility to conduct research in this domain and promote the construction of buildings using 3DPC by common man in India. To conduct research, 3D Concrete Printers, having 3D Printer bed, locomotion system with automated control and pumping system, along with software to manage and run the 3D Printer have been commissioned at Laboratory scale (for rheological characteristic design of concrete) and Large-Scale Printer for full-scale printing upto three story.

His visit highlighted CSIR-CBRI's pivotal role in driving transformative changes in the construction sector, with a focus on innovation, safety, and sustainability. The Secretary's remarks serve as a testament to the institute's leadership in addressing national challenges through cutting-edge research and development.

Inauguration of 3D Printed Concrete Building (3DPC) Facility

World Habitat Day 2024 Celebrations

BMTPC participated in the World Habitat Day 2024 celebrations organized by the Ministry of Housing & Urban Affairs at Vigyan Bhawan, New Delhi on 9th October, 2024. The Council organized a Painting Competition for Differently Abled Children on the theme "Engaging youth to create a better urban future". The exhibition of the winning entries was also organised on the occasion. The winners of the Painting Competition were felicitated by Shri Tokhan Sahu, Hon'ble Minister of State for Housing and Urban Affairs, Govt. of India in the august presence of Shri Katikithala R Srinivas, Secretary, Ministry of Housing and Urban Affairs, Govt. of India and other dignitaries during the event.

On this occasion, the Council also brought out Special Issue of Newsletter "Nirman Sarika" on the theme of the World Habitat Day. The publication was released by Shri Tokhan Sahu, Hon'ble Minister of State for Housing and Urban Affairs, Govt. of India in the presence of and Secretary, MoHUA on 9th October, 2024 at New Delhi.

SVSU Workshop on 3D Concrete Printing

BMTPC organizes capacity building and training programmes, workshops, exhibition on regular basis in the areas of Emerging Technologies, Good construction practices, Sustainable & Green Construction practices, Earthquake Resistant Design & Construction etc.

In order to sensitize the students and faculty of Sri Visveswarya Skill University (SVSU), BMTPC in association with SVSU organized a one day Workshop on "3D Printing Technology for Housing & Building Construction" on December 12, 2024 at SVSU campus, Palwal, Haryana. The workshop was attended by around 100 students and faculty members. The objective of the programme was to sensitize students and faculty/professionals about the 3D Printing Technology for Housing & Building Construction being used in India. Participants got an opportunity to learn how 3D printing technology works with the robotic technique for fast, precise and complex construction. Specialized presentations were made by the industry experts on 3D Printing Technology from M/s Tvasta Manufacturing Solutions Private Limited, Chennai, M/s Micob Private Limited, Gandhi Nagar, M/s Simpliforge Creations 3D Creation Private Limited, Hyderabad, M/s Cretebots Digital Constructions Private Limited, Pune and L&T.

For further details, please contact:

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