

Compendium of Indigenous Innovative Building Materials and Construction Technologies

SHOWCASED DURING

Indian Housing Technology Mela

Promoting Indigenous & Innovative Materials, Skills, Construction
Techniques & Processes for Low & Mid-Rise Affordable Houses

5-7 October 2021 - Indira Gandhi Pratishthan, Lucknow, Uttar Pradesh





“भारत में कंस्ट्रक्शन की अप्रोच में हमने एक और बदलाव किया है। अब चाहे सड़कें हों, रेजिडेंशियल अपार्टमेंट्स हों या फिर कमर्शियल बिल्डिंग्स, इको फ्रेंडली, डिजास्टर रेजिसटेंट, और एनर्जी एफिशिएन्ट निर्माण को प्रोत्साहन दिया जा रहा है...”

– नरेन्द्र मोदी





DURGA SHANKER MISHRA
Secretary
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Preface

Pradhan Mantri Awas Yojana-Urban (PMAY-U), single largest housing programs in the world under the leadership of Hon'ble Prime Minister, is in advanced stage of implementation by Ministry of Housing and Urban Affairs (MoHUA), Government of India and aims to provide all weather pucca houses to all eligible beneficiaries in urban areas by year 2022 when the nation completes 75 years of its Independence. PMAY(U) targets to provide pucca houses to about 11.30 million household in the country. Further, due to rapid urbanisation, massive construction activities are undergoing and planned in all the States/UTs for creating affordable housing with allied infrastructure.

Looking at the target of providing houses in urban areas, it is well-nigh impossible to achieve it with traditional brick, mortar & cast-in-situ RCC construction. The age-old practices are no longer sustainable in the light of fast depletion of natural resources, climate change, green house gas (GHG) emissions, energy scarcity and slower speed of construction. In addition, the prevalent construction practices are labour-intensive and time consuming. Therefore, it is prudent to bring in the forefront alternative & innovative building materials, construction technologies and processes in the construction sector.

Housing for all Mission has triggered major construction technology transition to bring resource-efficient, climate-responsive, disaster-resilient, cost-effective sustainable building technologies. Through PMAY-U, sustainable building materials, local design & skills and innovative construction methodologies are being disseminated for their large-scale adoption to beneficiaries, state govts, professionals and artisans. The overall objective is to ensure sustainable, safe and affordable house to each household. New construction technologies in India have been gaining usage but the pace needs to be accelerated. A concerted effort is required to create and enabling eco-system to facilitate technology transition from conventional to new technologies.

Hon'ble Prime Minister has emphasized the need to accelerate the adoption of new construction technologies to improve the pace and quality of construction under PMAY-U to address the challenges of rapid urban growth and its attendant requirements. Construction of houses at the scale of PMAY(U) offers an opportunity for inviting alternative technologies from both within the country and across the globe, which may stimulate a major transition through introduction of cutting-edge building materials, technologies and processes.

Taking the vision of Hon'ble Prime Minister forward, in March 2019, MoHUA organised Global Housing Technology Challenge - India (GHTC-India) which aimed to identify and mainstream globally best

available proven construction technologies that are sustainable, green and disaster resilient through a challenge format which can bring a paradigm shift in construction practices for affordable housing. GHTC-India has three components viz. i) Construction Technology India (CTI): biennial Expo-cum-Conference, ii) Identifying Proven Demonstrable Technologies from across the globe to construct Light House Projects (LHPs), and iii) Providing Incubation and Acceleration support for promoting Potential Future Technologies (domestic) through establishment of Affordable Sustainable Housing Accelerators-India (ASHA-India).

54 Innovative Construction Technologies were shortlisted as per their suitability for different geo-climatic regions of the country and grouped into six broad categories namely (i) Precast Concrete Construction System - 3D Precast volumetric (ii) Precast Concrete Construction System - Precast components assembled at site (iii) Light Gauge Steel Structural System & Pre-engineered Steel Structural System (iv) Prefabricated Sandwich Panel System (v) Monolithic Concrete Construction, and (vi) Stay in Place Formwork System. These technologies were mostly found to be suitable for high rise structures and have potential to be used under Affordable Housing in Partnership (AHP), In-situ Slum Rehabilitation (ISSR) component of PMAY-U and other high-rise housing projects being constructed in the country

As a part of GHTC- India, six Light House Projects (LHP) consisting of about 1,000 houses each with physical & social infrastructure facilities are being constructed at six places across the country namely Indore (Madhya Pradesh); Rajkot (Gujarat); Chennai (Tamil Nadu); Ranchi (Jharkhand); Agartala (Tripura) and; Lucknow (Uttar Pradesh). The foundation stone of all 6 LHPs was laid by the Hon'ble Prime Minister on 1st January, 2021 through Video Conferencing jointly with concerned Governors/ Chief Ministers/ State Ministers at the site of the LHPs. These LHPs will demonstrate and deliver ready to live mass housing at an expedited pace as compared to conventional brick and mortar construction and will be more economical, sustainable, of high quality and durability. These projects shall serve as Live laboratories for all stakeholders including Research & Development leading to the successful transfer of technologies from the lab to the field. Accordingly, an enrolment drive for Technograhis who will be change agents of innovative and sustainable technologies has been initiated.

Under PMAY (U), more than 60% individual houses are constructed by beneficiaries themselves which are primarily single or double storey houses through local masons/ artisans. The requirement of building materials and construction technologies is different for these individual houses than those required for multi storeyed mass construction. It was, therefore, imperative to identify innovative appropriate construction technologies, materials and processes available in India for their use in construction of houses. Accordingly, MoHUA organised Indian Housing Technology Mela (IHTM) as part of New Urban India Conference cum Expo during 5th-7th October 2021 in Lucknow, UP. The objective of the Mela was to provide a platform for indigenous and innovative building materials, components, tools & equipment, construction processes and technologies that are sustainable and suitable for construction of low and medium rise (upto G+3 storey) houses for demonstration, cross learning, enabling better adoption, market linkages and achieving desired scale.

During IHTM, 84 innovative technologies/systems/products/materials/machinery were showcased by exhibitors. After due consideration and assessment, Technical Evaluation Committee (TEC), set up by MoHUA, has grouped all the technologies/systems/products/materials in four broad categories namely

(i) Building Systems/ Products for construction of low rise houses (upto G+3) (ii) Products/Technologies Primarily from Recycling of Industrial/Agricultural wastes, Waste Management Systems (iii) Materials & Components (Doors, Windows, Construction Chemicals, Insulation, Plumbing, Plastering, Machinery) (iv) Technologies already shortlisted under GHTC-India & suitable for low rise housing.

All the 84 technologies are being published in the form of a Compendium which provides various details such as technology brief, salient features, economic aspects, sustainability aspects, suitability & availability, limitations, market linkages, certifications/endorsement, its application in real projects in India and also provides contact details of technology providers. I hope this compendium will be helpful to policy makers, public & private construction agencies and other concerned stakeholders for its adoption in their future housing projects.

In view of the clarion call given by Hon'ble Prime Minister for Atamnirbhar Bharat, it is opportune time to promote technology & innovations in housing especially for low to mid rise structures for Beneficiary Led Construction (BLC) based on local materials, local skills & construction techniques amalgamated with updated knowledge to achieve affordability, sustainability, energy efficiency & disaster resilience. This compendium will serve as an useful resource for further learning & adoption.

New Delhi
November 10, 2021



(Durga Shanker Mishra)

Acknowledgements

The genesis of organizing a Mela showcasing domestically developed innovations in the area of building materials, processes, technologies & products germinated after the successful organization of Global Housing Technology Challenge-India (GHTC-India) for shortlisting of proven demonstrable construction systems from across the globe for affordable mass housing. Shri Durga Shanker Mishra, Secretary, Ministry of Housing and Urban Affairs (MoHUA) intellectualized the entire concept of the Mela and has been the sole motivating factor to make this event a grand success. It was aptly named Indian Housing Technology Mela (IHTM) by Secretary and was organized in Lucknow, Uttar Pradesh along with Azadi@75: Conference-cum-Expo as part of Azadi ka Amrit Mahotsav (AKAM) from 5-7 October 2021 to celebrate 75 years of India's independence. The event was inaugurated by Hon'ble Prime Minister. There were 81 exhibitors displaying 84 innovative materials, processes, products in IHTM. As a follow up to the event, a Compendium of all innovations displayed during the Mela has been prepared containing technical information, audio-visual details and contact details of exhibitors. The Compendium will serve as a useful resource for propagation & dissemination of these products for field level applications and replication across the country. On behalf of the entire team involved in this publication, we wish to express our deep gratitude towards Shri Durga Shanker Mishra, Secretary, MoHUA, but for him, this would not have been possible. I sincerely thank Shri Surendra Kumar Bagde, Additional Secretary (Housing), MoHUA who led the team, gave valuable suggestions, encouragement and steered the IHTM event & publication. The erstwhile Joint Secretary & Mission Director, Housing for All (HFA), Shri Amrit Abhijat played a pivotal role in planning and streamlining the activities for these events. Shri Kuldip Narayan, the current Joint Secretary & Mission Director (HFA) has been very supportive and encouraged the whole team for timely publication of the document & giving it a final shape.

Shri R.K. Gautam, Director (HFA) has been in the helm of affairs for IHTM and I wish to thankfully acknowledge his guidance, support & contribution in organising the event and developing this valuable document. Although the entire PMU team of HFA contributed into this publication but one person who stands out is Shri Manish Kumar for designing, presenting & editing the publication. I also place on record the dedicated efforts put up by Shri Kanha Godha, Shri Naveen Kumar, Shri J.K. Prasad, Shri Abhishek Mishra of PMU of HFA. The efforts of IEC team at HFA comprising of Ms. Pooja Gupta, Shri Hitesh Sharma, Shri Akash Mathur, Ms. Deepti Singh, Ms. Shruti Shiksha, Ms. Roopal Khanna and the Wizcraft team led by Shri Bharat Sharma are also sincerely acknowledged and appreciated.

I wish to express my gratitude to all exhibitors who participated in the Mela & sent the technical details of their products for the Compendium. Also, I sincerely convey my appreciation to all members of Technical Evaluation Committee for interacting with the exhibitors during the event and shortlisting the technologies. Last but not the least, my team at BMTPC comprising of Shri Sharad Kr. Gupta, Shri C. N. Jha, Shri Pankaj Gupta and Shri Dalip Kumar deserve a special mention for compiling the technical information and putting it in a presentable form in this Compendium.

3rd Day of December, 2021
New Delhi



(Dr. Shailesh Kr. Agrawal)
Executive Director, BMTPC

Background

Ministry of Housing and Urban Affairs (MoHUA) is implementing Pradhan Mantri Awas Yojana-Urban (PMAY-U) which aims to provide all weather pucca houses to eligible beneficiaries in urban areas by year 2022. PMAY(U) targets the provision of pucca houses to about 11.20 million households in the country.

In the PRAGATI¹ meeting held on 12th July 2017, Hon'ble Prime Minister emphasized and exhorted the States/UTs to accelerate adoption of innovative and alternative construction technologies to improve the pace and quality of work under PMAY-U and address the challenges of rapid urban growth and its attendant requirements. Construction of houses at the scale of PMAY(U) offers an opportunity for inviting alternative technologies from both within the country and across the globe. This may trigger a major transition through introduction of cutting-edge building materials, technologies and processes.

Under PMAY(U), a Technology Sub Mission (TSM) has been set up to facilitate adoption of modern, innovative, green technologies and building materials for faster and quality construction of houses. The sub mission, inter alia, works on green buildings using natural resources, innovative technologies and materials, earthquake and other disaster resistant technologies and design.

In the light of the above, MoHUA initiated **Global Housing Technology Challenge India (GHTC-India)** in January 2019 which aimed to identify and mainstream the globally best available proven construction technologies that are sustainable, green and disaster resilient through a challenge format which can bring a paradigm shift in construction practices for affordable housing. GHTC-India has three components viz. i) Construction Technology India (CTI): biennial Expo-cum-Conference, ii) Identifying Proven Demonstrable Technologies from across the globe to construct Light House Projects (LHPs), and iii) Providing Incubation and Acceleration support for promoting Potential Future Technologies (domestic) through establishment of Affordable Sustainable Housing Accelerators- India (ASHA-India).

Construction Technology India (CTI), 2019, the 1st Biennial Expo-cum-Conference was organized on 2-3 March 2019 for providing a platform for exhibition, assessment and promotion of Innovative Construction Technologies from across the globe. Both Indian and International Technology Providers/ Companies participated in this challenge process.

- a. In the CTI-2019 Expo-cum-Conference 54 Innovative Construction Technologies were shortlisted as per the suitability of construction in different geo-climatic regions of the country and grouped into six broad categories namely (i) Precast Concrete Construction System - 3D Precast volumetric (ii) Precast Concrete Construction System - Precast components assembled at site (iii) Light Gauge Steel Structural System & Pre-engineered Steel Structural System (iv) Prefabricated Sandwich Panel System (v) Monolithic Concrete Construction, and (vi) Stay in Place Formwork System. These technologies were mostly found to be suitable for high rise structures and have great potential to be used under Affordable Housing in Partnership (AHP),

¹ PRAGATI (Pro-Active Governance And Timely Implementation) is a multi-purpose and multi-modal platform chaired by Hon'ble Prime Minister, aimed at addressing common man's grievances, and simultaneously monitoring and reviewing important programmes and projects of the Government of India as well as projects flagged by State Governments.

In-situ Slum Rehabilitation (ISSR) verticals of PMAY-U and other high-rise housing projects being constructed in the country.

- b. As a part of GHTC- India, six **Light House Projects (LHP)** consisting of about 1,000 houses each with physical & social infrastructure facilities are being constructed at six places across the country namely Indore (Madhya Pradesh); Rajkot (Gujarat); Chennai (Tamil Nadu); Ranchi (Jharkhand); Agartala (Tripura) and; Lucknow (Uttar Pradesh). The foundation stone of all Six LHPs was laid by the Hon'ble Prime Minister on 01.01.2021 through Video Conferencing jointly with concerned Governors/ Chief Ministers/ State Ministers at the site of the LHPs.
- c. These LHPs are showcasing the use of six distinct shortlisted innovative technologies (one each from the above broad groups) for field level application, learning and replication. The LHPs will demonstrate and deliver ready to live mass housing at an expedited pace as compared to conventional brick and mortar construction and will be more economical, sustainable, durable and of high quality. These projects shall serve as **Live Laboratories** for all stakeholders including Research & Development leading to the successful transfer of technologies from the lab to the field. The whole process of Live Laboratory will be based on the principles of **Learning, Exploration, Adaptation and Replication** through on-site learning, multi stakeholder consultation, finding ideas for solutions, learning by doing, experimentation and innovation for further adaptation of these disruptive technologies as per local needs and contexts.
- d. A drive for free online enrolment of **Technograhis** has been started for exposing interested stakeholders to innovative construction technologies through onsite activities. Technograhis shall learn different phases of the use of innovative technologies in LHPs and through Offsite Workshops/ Webinars, Webcasting, Mentoring on Technical know-how/Module etc. They are change agents of innovative and sustainable technologies which will bring about technology transition in the construction sector and its adoption in the country.
- e. A e-Learning module on GHTC-India website has been developed related to Live Laboratories i.e. <https://ghtc-india.gov.in> wherein all stakeholders can register themselves to visit six LHPs, learn the use of latest innovative technologies, innovate and adapt as per their local needs and contexts as new construction technologies to be adopted as 'Make in India'.
- f. The Ministry in partnership with Building Materials and Technology Promotion Council (BMTPC) and School of Planning and Architecture (SPA), Delhi is conducting an online course on **Vulnerability Atlas of India** which is useful for urban managers, State & National authorities dealing with disaster mitigation and management in the evaluation of multi-hazard profile of the region and incorporating them in DPRs, Design basis and Tender documents. The Ministry is also conducting an online certificate course named **NAVARITI** (New, Affordable, Validated, Research Innovation Technologies for Indian Housing) In collaboration with BMTPC and SPA, Delhi with an aim to enhance the capability of building professionals about the new and emerging building materials, technologies and processes for construction.
- g. Further, under **ASHA-India**, Incubation Centres have been set up in four Indian Institutes of Technology (IITs) in Bombay, Kharagpur, Madras, Roorkee and at CBRI-CSIR at North-East Institute

of Science and Technologies (NEIST), Jorhat to provide Incubation Support to potential future technologies that are not yet market ready and undergoing iterative design and development phase. For those potential future technologies that have completed prototype stage and are at various stages of readiness and require up-scaling, investment, publicity and market support, Acceleration support through Accelerator Workshops and Master classes on various aspects are being provided.

Through PMAY (U), a basket of options is offered to ensure inclusion of a greater number of people depending on their income, finance and availability of land through four Verticals i.e. In Situ Slum Rehabilitation (ISSR), Affordable Housing in Partnership (AHP), Beneficiary Led Construction (BLC) and Credit Linked Subsidy Scheme (CLSS).

Out of 1.14 Crore sanctioned houses under PMAY(U), more than 60% houses are constructed under the BLC vertical. The typical construction under AHP and ISSR is apartments in clusters (G+3 and above) whereas under BLC, it is owner driven single or double storey houses on the land available with the beneficiaries and is self-constructed or through local masons/artisans. Cultural preferences, geo-hazard conditions, and availability of local materials/ skills further influence the type of construction in different regions under BLC vertical.

During the implementation of the Mission, it has been observed that depending on the natural resources of the region, socio-economic conditions, living preferences and climatic and hazard conditions of the region, use of locally available materials and time-tested indigenous, traditional and local construction practices are undertaken. This includes EKRA walling in North East, Dhajji Diwari in Jammu and Kashmir & Himachal Pradesh, Bhonga Houses in Kachchh, and stabilized mud blocks in extreme weather conditions which are found to be regionally more suitable, sustainable, cost effective and easily implementable.

Existing Knowledge Repository: Various research institutes across the country have further developed and used cost effective regionally available technologies over the years such as BMTPC , New Delhi, Central Building Research Institute, Roorkee; Structural Engineering Research Centre, Chennai and other Institutions such as Centre for Application of Science and Technology in Rural Areas (ASTRA) in IISC, Bangalore, HUDCO, New Delhi, Centre of Science for Villages (CSV Wardha), Indian Plywood Research Institute, Bangalore, Habitat Technology Group (HTG) Thiruvananthapuram, Auroville Building Centres (AVBC), Nirmithi Kendra in Kerala etc. In addition, various creative professionals over time have also introduced many innovative options that contribute to cost reduction and offer solutions which are functional, durable, aesthetically pleasing and acceptable by users.

Many of these materials and construction techniques have been tried with success in some projects which can be replicated and upscaled given its advantages. Further, they remained confined in their region and not reached to other regions of the country. Limited outreach and low level of awareness about these technology options at the level of practicing professionals, artisans and individuals dealing with house construction; inadequate delivery mechanism and knowledge dissemination; lack of enabling institutional mechanisms and entrepreneurship are some of the reasons for these not getting into mainstream practice. Both traditional construction techniques and materials as well as alternate technologies that are innovative and sustainable are to be identified with their suitability in other

regions with a focus on the need of individual houses under BLC and other mid-rise houses across the country with diverse climatic and hazard conditions.

On the one hand, there are pockets of rich knowledge and repository on use of indigenous construction materials and technologies; and on the other, there is tremendous scope and interest among Innovators, Start-ups, Entrepreneurs, and Small & Medium Developers on use of Innovative and Alternate Construction Systems, Material, Components and Processes for low and mid-rise housing categories.

It is, therefore, imperative to promote the adoption of these technology options and identify other innovative appropriate construction technologies, materials and processes for their use in construction of houses under BLC and other low and mid-rise housing. For successful implementation of such technologies in field, the supply side should be equally strong. Materials and components should be easily available without additional burden of high transportation cost.

Apart from creating necessary awareness about the technologies, materials and processes; capacity building of professionals, masons, construction workers and artisans would be required for use in the field. Other than structural systems, other innovations in building materials, components, tools and equipment like automatic plaster machine and bar bending machines that help in bringing speed and quality in low and mid-rise construction across the country are essential.

It is important to provide a common platform to bring together all above stakeholders to demonstrate and interact at one place on various options available with regard to technologies, materials and processes for use of indigenous and alternate technologies in BLC and similar type of house construction for different Geo-climatic regions of the country.

Also, a concerted effort is required to create mass awareness to accept such innovations through expositions and other outreach methods that will mainstream its use. It is important to give PMAY(U) a region wise complete technology package to beneficiaries and to States/UTs/ULBs that will help in construction of houses that are cost –effective, sustainable and faster which will enable the country to fulfil the target set up by Hon’ble Prime Minister to provide pucca house to all households by 2022.

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**GLOBAL
HOUSING
TECHNOLOGY
CHALLENGE** INDIA

Indian Housing Technology Mela (IHTM)

A. Building Systems/ Products



“आज गरीबों के लिए, मध्यम वर्ग के लिए, घर बनाने के लिए नई टेक्नोलॉजी देश को मिल रही है। तकनीकी भाषा में आप इसे लाइट हाउस प्रोजेक्ट कहते हैं। आज ये टेक्नोलॉजी एक शहर में इस्तेमाल हो रही है, कल को इन्हीं का विस्तार पूरे देश में किया जा सकता है...”

– नरेन्द्र मोदी

CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



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Technology Detail

COMPRESSED STABILISED EARTH BLOCKS (CSEB)

*Alternate of burnt clay bricks / cement concrete blocks
for load bearing and non-load bearing walls*



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Video

CONTACT DETAILS

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BRIEF

Compressed stabilized earth blocks (CSEB) are manufactured from local soil mixed/ stabilised with small amount of cement (upto 5%), sand and water. Being produced from local soil, it offers a sustainable alternate to burnt clay bricks/cement concrete blocks. These blocks are compressed in a Press (manual or motorised) and cured for 28 days to get desired compressive strength. The Auroville has also developed a special machine "Auram Press 3000" for production of these blocks and offers 70 types of blocks with 18 moulds.

Depending upon application, the blocks can be solid, hollow, round or customized. These blocks can also be used for construction of columns, floors and roofs.

The top soil being fertile is removed and deeper soils are extracted as main raw material for production of these blocks. Depending upon the characteristic of local soil, a design mix comprising of local soil, cement, sand and water is prepared and is cast in moulds through a press to produce blocks of desired strength as per application.



SALIENT FEATURES

- The dry compressive strength of these blocks after 28 days of curing varies from 5 to 9 MPa whereas wet compressive strength varies from 3 to 4 MPa (after 24 h. immersion)
- The dry bending and shear strength after 28 days curing varies from 0.5 to 1 MPa and 0.4 to 0.6 MPa respectively.
- The water absorption is 8 to 12% after 24 h. immersion whereas the bulk density of these blocks varies from 1800 to 2000 kg/m³.
- The quality of blocks is greatly influenced by the soil quality, compression force, curing and percentage of stabilizer and quality of manufacturing.
- These blocks offer sustainable solution for wall construction replacing burnt clay bricks and cement concrete blocks.
- The blocks can be manufactured at the site itself leading to cutting down transportation cost saving fossil fuel and generating local employment.
- Green house gas emissions are significantly reduced as these blocks are not fired in kilns as done in the case of burnt clay bricks.
- Being made from local soil, these blocks are resource efficient, cost-effective, climate resilient, energy efficient and eco friendly.
- These blocks are particularly suited for rehabilitation purpose after disaster and have been used worldwide including after Bhuj earthquake of 2001, 2003 Bam earthquake of Iran, 2004 Tsunami relief and rehabilitation at Tamil Nadu.



ECONOMIC ASPECTS

- CSEB are cost effective and help local economy.
- CSEB wall is 16 % cheaper per m² of wall as compared to burnt clay bricks
- CSEB wall is 26 % cheaper per m³ of finished wall as compared to burnt clay bricks
- Much less mortar is required (50 to 60% less)
- Stabilised earth mortar is 30% cheaper than cement sand mortar
- No plaster is required for CSEB walls
- Savings in shuttering and construction time.



SUSTAINABILITY ASPECTS

- THERMAL LAG - An earth wall of 50 cm thickness has a thermal lag of 12 hours.
- HYDRO-THERMAL BEHAVIOUR
 - As clay is only stabilised and not burnt, it can still absorb and release some moisture through evaporation and condensation. This phenomenon is called “latent heat”:
 - The outside temperature is higher: the wall will evaporate moisture. This will cool down the wall and thus the building inside.
 - The temperature is lower outside: the wall will condense moisture. This will create heat in the wall and thus the building inside.
 - Exposed CSEB walls regulate indoor humidity, helping achieve thermal comfort throughout the year.
 - With proper planning and design, less energy is needed to achieve a comfortable indoor environment.
- Embodied energy per m³ of raw material - 548.52 MJ/m³ (~11.2 times less than burnt clay bricks)
- Carbon emission (CO₂) - 49.37 Kg/m³ (~13 times less than country fired bricks)
- The earthen construction has ~4 times less embodied energy than a conventional building of RCC frame, RCC slab, infill with fired bricks.
- The earthen construction has low emissions for the operation and use (~3 times less than a conventional building).



SUITABILITY & AVAILABILITY

- These blocks can be used in all climates, from temperate to very hot, tropical and mountains climates and can be used in Pan world in all continents.
- Depending upon the design mix, geo-climatic conditions, the blocks can be used for load bearing application for upto 4 floors.
- Sold by Auroville Pan India. CSEB can be produced using Auram press 3000 anywhere in India.
- Not all type of soil can be used for CSEB. It is required to conduct testing of soil before manufacturing Bricks/Blocks.
- Currently being used in 38 countries world wide and 13000+ human resource from 92 countries have been trained by Auroville for earth construction.



LIMITATIONS, IF ANY

- Not suitable for high rise structures. However, can be used for non-load bearing applications or filler walls.
- In order to have quality production of blocks, the soil need to be tested characterized and design mix need to be prepared.
- Training of masons and artisans are required.

MARKET LINKAGES

- The precast components can be locally cast near construction site.
- It can also be produced by small entrepreneurs and supplied to consumers at State/ Block/ village level

MAJOR PROJECTS

- 2,698 earthquake resistant houses, after the 2001 Bhuj earthquake in Gujarat.
- Auroville Kindergarten, Solar kitchen Prarthna apartments, Tibetan pavilion, etc.
- Primary School at Jantanagar, Nepal - Built in 20 days with the community (Precasting was done in 3 months)
- Al Medy Mosque at Riyadh, 420 m², 18.05 m high minaret - Built in 7 weeks with ~ 75 unskilled masons and ~ 150 workers
- Kaza Community Centre, Spiti valley, India – Rammed earth - First prize (Low Carbon Award) from Green Building & City Solutions Awards 2016
- Sharanam at Pondicherry - Double storey lodges

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- IS 1725-2013 Stabilized Soil Blocks for General Building Construction
- GSDMA India, adopted CSEB for the rehabilitation of the regions affected by the January 2001 Gujarat earthquake in Kutch district
- Government of Iran (Housing Foundation) adopted CSEB for the rehabilitation of the regions affected by the December 2003 earthquake in Bam.
- The government of Tamil Nadu (Tsunami Relief and Rehabilitation), India, for the reconstruction of the zones affected by the December 2004 Indonesian tsunami.



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

PRECAST TECHNOLOGY USING JOINTING TECHNIQUE

*Alternate to conventional cast-in-situ building construction systems
e.g. RCC framed and load bearing construction*



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Video

CONTACT DETAILS

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BRIEF

M/s N M Roof Designers (NMRD) have been into structural consultancy and turnkey construction including prestressed and precast concrete works. NMRD has an innovative cost-effective, precast RCC system for construction of houses using patented "Sogani Jointing Technique". It is a building system which employs fully precast concrete components e.g. floor, walls and roof with special cast-in-situ patented jointing system at site.

The precast construction system has already been approved under Global Housing Technology Challenge – India under Precast Concrete Construction System-Precast Components assembled at site category and is suited for high to mid-rise structures. However, NMRD claims that the precast technology can be extended for isolated single storey houses with their innovative solution and will be economical enabling faster delivery of quality affordable houses.

The company holds Guinness World Record for design and construction of reinforced cement concrete flat roof with single span of 119 ft. which is the largest RCC span in the world.



SALIENT FEATURES

- The structure is entirely made of precast reinforced panels for foundations, shear-walls and slabs.
- The precast floors, walls and roofs are joined on site using "Sogani Jointing Technique".
- Special treatment of joints for water tightness.
- The structure has smooth finish, higher strength & good quality and facilitating faster construction.
- The plant/factory can be set up at the site as per requirements.
- The other salient features are textbook casting, meticulous curing and smooth finish.
- A fully finished 250 sft. Carpet area house with one bedroom, living, kitchen and toilet can be handed over in 5 days complete with doors, windows, flooring, painting, plumbing fixtures, electrical fixtures, kitchen counter, etc as claimed by NMRD.

ECONOMIC ASPECTS

- NMRD has submitted a proposal for construction of isolated PMAY single storey houses under Beneficiary Led Construction vertical to AP Govt. at a cost of Rs. 1.80 lakh for 250 sft. House.
- The precast concrete construction has advantages over conventional cast-in-situ construction such as resource efficiency, low life cycle cost, less maintenance, waste minimization, affordability and durability.
- Building components being cast under controlled conditions are of good quality and durable.



SUSTAINABILITY ASPECTS

- The precast concrete construction has high thermal mass and long lag times. In building design, thermal mass is a property of the mass of a building which enables it to store heat, providing “inertia” against temperature fluctuations.
- Casting of building components being done in controlled conditions, sustainability is achieved in terms of material and human resource efficiency, disaster resilience and durability.
- Precast concrete construction enables use of industrial waste such as flyash, slags and other pozzolanic materials in house construction.
- Strong and durable with multi-hazard resistant construction with respect to earthquakes, wind/cyclone and floods.



SUITABILITY & AVAILABILITY

- Suited for all weather conditions. However, under very hot climatic conditions, the structure may require proper insulations.
- Plant setup in multiple parts of the country including Jaipur, Ludhiana, Ranchi, Rajahmundry, Pune
- Suitable for construction of single storied & upto G+3 buildings.





LIMITATIONS, IF ANY:

- Since it is a patented system by NMRD, the feasibility and techno-viability of the company need to be ascertained before undertaking the large size projects.
- Commercially not viable for small volume of works. Minimum Order value should be Rs. 1 crore.
- Requires experienced structural designers to design and highly trained technical staff with help from skilled and unskilled workers to manufacture, transport, erect and assembly.
- Depending upon the geo-climatic zone, the structural design/structural integrity needs to be vetted by Institute of repute i.e. IITs, NITs or CSIR laboratories before field level applications.

MARKET LINKAGES

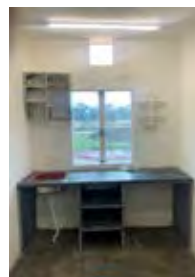
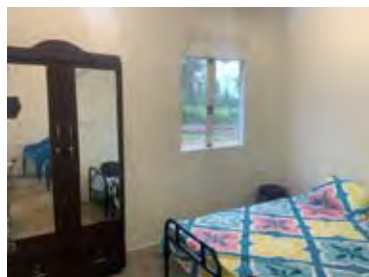
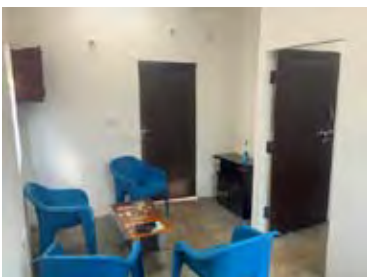
- The precast components can be locally cast near construction site.
- Being patented system, NMRD can set up the plant near site or supply the components as per the project requirements and viability anywhere in India.

MAJOR PROJECTS:

- Houses in Rajahmundry, AP,
- Jaipur National University,
- Musepur, Pilibhit Tiger Reserve

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Technology certified by IIT Delhi & JNTU Kakinada.



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

'KONCRETE' - KONARK AERATED CONCRETE REINFORCED PANEL

Alternate to brick/stone masonry construction.



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Konark Aerated Concrete Reinforced Panel are autoclaved aerated concrete panels manufactured using fly ash, cement, gypsum, lime, sand, aluminium powder, steel reinforcement, and anti corrosive paint. These panels are manufactured with modern technology and come in the form of ready to build wall, roof and floor which minimizes the use of materials and savers construction time enabling faster construction.

AAC panels are available in sizes with length ranging from 1m to 6m, width 600mm and thickness 150mm / 200mm / 250mm (with tongue & groove) for external wall and thickness 100mm / 125mm for internal wall or partition wall, which are suitable for multi-storied residential & commercial constructions, industrial warehouses and sheds, shopping malls, hospitals and small modular residential constructions.

These innovative AAC reinforced panels can be used for load bearing and non-load bearing applications. The conventional brick wall is essentially a wet wall construction making use of bricks laid over mortar whereas AAC wall construction is a dry wall construction requiring no water.



SALIENT FEATURES

- Light in Weight & durable
- High Thermal & acoustics insulation
- Speedy Construction Process
- Design flexibility, customizable, ease of working
- Energy efficiency
- Environment Friendly, utilizes Fly Ash as major ingredient
- Good Fire resistance
- Termite resistant
- Higher flexural strength
- Fewer Joints leading to less jointing mortar consumption and leak-ages
- Number of Auxiliary Columns can be minimized
- Intermediate bond beams can be eliminated
- Reduce structural cost because of light weight
- Less number of labour and storage space
- Better aesthetic look of construction.



ECONOMIC ASPECTS

- Due to lighter weight, the dead load of building gets reduced thereby enabling economical cost effective design
- Due to smooth finish and less joints, the demand of plaster and jointing mortar get minimised.



SUSTAINABILITY ASPECTS

- Resource efficiency: The major raw materials used is fly ash which is industrial waste, a by-product of Thermal Power Plants. Further, ACC Panel construction, being dry wall construction, do not require water for curing thus reducing water consumption. Being light weight, require less workforce for installation.
- Quality and Durability - AAC Panels are manufactured in collaboration with HESS Technology giving high quality product. As regards durability it has been used in Europe for over 70 years and Middle East for past 40 years.
- Speedy Construction – The panel are easy to install due to light in weight and readily availability of different size which reduce the construction time by 15-20%
- Energy Efficiency – It is having an excellent thermal insulation due to its tiny pores and the thermal mass of panel. Hence help in reducing the heating and air condition cost of building.
- Seismic Resistance - Due to light weight AAC Panel is very much effective for earthquake prone area. Embedded reinforcement makes the product with more compressive and flexural strength so lateral thrust resistance capacity is more.

SUITABILITY, AVAILABILITY

- Suitable for all climatic conditions.
- Panels can be used for all kinds of modern day construction like Residential Complex, Individual house for G+2/G+3 including roof panel, Commercial , Shopping Malls, Hotels & Resorts, Hospitals, Schools, Industrial Warehouses and sheds, Boundary Walls etc.



LIMITATIONS, IF ANY:

Although reinforced AAC panel has been a long – accepted construction material, the literature is not without reference to limitations in its use. Some frequent reported limitations are;

- Chipping of material.
- The face tends to get damaged easily, e.g. from scaffolding.
- External faces are highly hygroscopic and it needs protective render which can breathe and should be protected from standing water.
- Anchor fixing on units needs careful planning to avoid pullout, especially for dynamic loads.
- Caution should be exercised in transporting and handling the units to avoid damage.

MARKET LINKAGES

- The panels can be supplied Pan India.

MAJOR PROJECTS

- Government of West Bengal PWD, Alipore Division, Bhabani Bhaban New Building
- Haldia Port, West Bengal
- Mani Pushpak Nirman Pvt. Ltd. - Ware House at Bantala Leather Complex, West Bengal



CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- PAC By BMTPC.
- BIS Certification.
- IGBC (CII) Certification
- GRIHA Certification
- IS: 6072-1971 & IS: 6073-2006 for AAC Reinforced Wall & Roof Panel



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



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COST EFFECTIVE TECHNOLOGY LIKE FERRO CEMENT WALLING AND ROOFING PANELS

*Alternate to conventional brick masonry wall and
RCC Slab construction.*



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CONTACT DETAILS

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BRIEF

M/s Tilothu Mahila Mandal (TMM) is a Building Centre established under Nirmithi Kendra Scheme of Government of India in 1995. Since then they have been promoting cost effective, eco-friendly housing using ferrocement utilizing local materials and skilled labour force. The Building Centre is also into skill development and empowerment, creating employment opportunity, developing local materials and skills and research & development.

The TMM Nirmithi Kendra has developed ferrocement based panels which can be used for walling as well as floor/roofing. Ferrocement is a system of construction using several layers of mortar (lime or cement, sand, and water) applied over welded wire mesh or closely spaced thin steel reinforcement.

Ferrocement is a type of thin-wall reinforced concrete of cement mortar reinforced with closely spaced layers of continuous and relatively small wire mesh. The mesh may be made of metallic or other suitable materials. Ferrocement has a very high tensile strength-to-weight ratio and superior cracking behaviour in comparison to conventional reinforced concrete. Unlike conventional concrete, ferrocement can be assembled into its final desired shape without the use of a form.

The ferrocement has an advantage over conventional RCC construction as the sections of building element produced are thin due to wire mesh giving high strength to weight ratio. The raw material used are cement, sand, mild steel wires and wire meshes.

The ferrocement panels can be used for variety of applications such as walling panels, roofing panels, domes, boundary walls, sun shades, staircases, doors & windows, toilet blocks, water tanks, manhole covers, cement benches, tree guards, etc.





SALIENT FEATURES

- Ferrocement panel can be used as replacement of load bearing brick walls.
- Ferrocement panels can also be used as replacement of RCC slabs.
- Cost effective, durable, aesthetic, easy to produce and fast to install.
- No stone chips, bricks needed, hence less polluting & resource efficient.
- No heavy or expensive machinery needed.
- Easy to train workers, particularly women – leads to empowerment.
- Low consumption of cement, steel thereby reducing the carbon footprint
- Being lighter in weight, provides an excellent alternative towards earthquake resistance
- Structure can be shaped such that heavy winds causes little damage.
- Interchanging of components possible



ECONOMIC ASPECTS

- Due to lighter weight, the dead load of building gets reduced thereby enabling economical cost effective design
- The panels can directly be used eliminating the need of plaster.
- Ferrocement is a cost effective technique and help local economy.
- Saving in shuttering and construction time.





SUSTAINABILITY ASPECTS

- Energy efficient, waterproof, fire resistant, earthquake resistant.
- Reduces Carbon Footprints – lesser quantity of steel and cement required.
- Since the components are produced at the site, embodied energy is less and transportation cost is reduced thereby minimising fossil fuel and green house gas emission.
- Local manpower can be easily trained thereby leading to employment opportunities.
- Empowering Make in India concept.
- Enhanced durability.



SUITABILITY AND AVAILABILITY

- Suits all climatic conditions except extreme hot conditions where insulation may be required.
- Ideally suited for beneficiary led construction under PMAY(Urban/Rural).
- Being light weight, suited for multi-hazard resistant construction.
- The technology is available in crude/nascent form in various parts of the country





LIMITATIONS, IF ANY

- The ferrocement panels for structural applications can be used for low rise structures.
- The ferrocement panels need to be manufactured under strict quality control conditions.
- In high rise structures ferrocement panels can be used as infill walls.

MARKET LINKAGES

- The ferrocement components can be locally cast near construction site.
- It can also be produced by small entrepreneurs and supplied to consumers at State/ Block/ village level.
- R&D labs such as CBRI have done considerable amount of R&D on ferrocement technology.

MAJOR PROJECTS

- Folded Plate roofing for Roadways workshops at Azamgarh (1977), Faizabad (1978), Amethi (1978),
- Folded Plate roofing Khajuraho (1984),
- Indian Railway Gang Huts at Chunar 16 Nos (1991)
- Toilets in Andhra Pradesh
- Sahara Institute of Management, Lucknow
- Indraprasth Resort Lucknow
- Boundary wall at Mahabodhi Temple Bodh Gaya
- School at Shobhekhap, Bihar
- Samvad Kaksh for Community Policing near Rohtas Fort, Bihar
- FC Toilet Bank at ITC, Munger, Bihar
- Housing for Poor Workers, Khatwa, Bihar
- Dwelling Units at Indrapuri, Bihar



CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- IS 13356 (1992) "Precast ferrocement water tanks" and Guide lines as per American Concrete Institute
- Certification from IIT Kanpur.
- Certification from IIT-BHU.



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



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Technology Detail

BAMBOO MAT CORRUGATED ROOFING SHEET & RIDGE CAP FOR ROOFING AND BAMBOO MAT WALL PANELS

*Alternate to conventional ACC/CGI roofing sheets and bamboo mat wall panel
as a replacement of masonry wall construction*



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Video

CONTACT DETAILS

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BRIEF

It is a patented bamboo based technology developed by Indian Plywood Industries Research & Training Institute (IPIRTI), Ministry of Environment, Forest and Climate Change, Govt. of India & Building Materials & Technology Promotion Council (BMTPC), Ministry of Housing & Urban Affairs, Govt. of India. Bamboo mat corrugated sheets, Ridge cap and Bamboo mat board are made out of multi-layer Bamboo mats soaked in PU resin and pressed in hot press.

The manufacturing process involves application of specially formulated Phenol Formaldehyde (PF) resin to the mats, assembling the resin coated mats and hot pressing in hydraulic press at specified temperature and pressure. Bamboo Mat Corrugated Roofing Sheets (BMCS) as IS:15476-2004 Corrugated bamboo roofing sheets (CBRS) are an excellent alternative to corrugated metal, plastic or asbestos roofing sheets.

Bamboo roofing sheets are environmentally friendly and a safe alternative to plastic, zinc or corrugated asbestos roofing panels. They have the same standard measurements as conventional corrugated roofing sheets. Bamboo sheets are durable and strong with excellent internal bond strengths and a high resistance to weathering, fire or insect attacks. They have an attractive and natural appearance and are easy to work with (cutting, drilling, etc.). The main raw material for the product is bamboo, which is the fastest growing plant and occurs naturally in the forests and is also suitable for plantation even over degraded lands. For manufacturing BMCS, bamboo is to be converted into mats that are hand woven by rural/tribal people, particularly women. Thus the product is both environment and people friendly.

Bamboo Mat Board is also manufactured in similar fashion as per IS:13958-1994 and can be used as infill wall panel with structural frame of RCC or steel, false ceiling, partitions, walling, wall paneling, etc. These products are certified as per IS relevant codes.





SALIENT FEATURES

- Green, Eco-Friendly, Sustainable, Renewable,
- Energy Efficient, Low thermal conductivity,
- Combined total energy consumption for the manufacturing Bamboo Corrugated Sheet is much less than Aluminum, Galvanized iron and fiber reinforced plastic sheets.
- Based on weather-o-meter and accelerator test conducted at IPIRTI, it is expected that products service life will be around 25 years
- High Load Bearing capacity, Good sound insulation,
- Surface rust proof, Fungus proof,
- 100% Boiling water proof, Termite resistance & fire retardant
- Provides employment in the rural/tribal areas
- Light-weight construction materials, quick to install, versatile, very sturdy & resilient.
- Non-sharp materials, and thus no harm caused to human lives.
- Products are detachable and can be dismantled and re-installed at different locations of the same design, size and dimensions.
- Technical specifications of BMCS: water absorption – 8.25%; density 0.92 gm/cc; load bearing capacity 5.65 N/mm for dry state and 4.55 N/mm for wet state; available in 8' x 3.5' / 7' x 3.5' / 6' x 3.5' sizes and 3.5 – 4.0 mm thickness.



ECONOMIC ASPECTS

- The cost of the BMCS is on the higher side as compared to CGI/ACC sheets.
- Being green, eco-friendly, sustainable, renewable, energy efficient, the life cycle cost of BMCS is lower.
- BMB is an excellent green mat board and cost-effective. Can be used as replacement of conventional boards at a comparable cost.





SUSTAINABILITY ASPECTS

- Low Thermal Conductivity (15% temperature reduction)
- Good Sound Insulation
- Produced from plantation timber bamboo and therefore, eco-friendly, sustainable and renewable.
- Energy consumption per ton is 22784 MJ. Four times less than the pre-coated GI sheets.
- BMCS has social impact as it creates huge indirect employment in the rural / tribal villages for the woven bamboo mat weavers / bamboo strip makers



SUITABILITY AND AVAILABILITY

- Suitable for all type of climatic conditions.
- Ideal for rehabilitation works.
- Can be made available in any part of the country.
- Has already been used by Govt. departments such as Railways, Tourism, Academic Institutions, Metros, etc.



LIMITATIONS, IF ANY

- Being produced in North Eastern Region, the cost economics needs to be worked out while using it in far flung areas.





MARKET LINKAGES

- There are very few agencies who are manufacturing these sheets and therefore, supply chain need to be ensured in a large scale project.

MAJOR PROJECTS

- Railways / Metro Railways / Airports / Tourism / Universities
- Pre-fabricated Structures & Housing in various parts of Country
- Being included in CPWD Schedule of Rates and Railways. The product is accepted Pan India and being used.



CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Specifications for bamboo mat corrugated sheets
 - IS:15476-2004
- Specifications for bamboo mat board for general purpose
 - IS: 13958-1994
 - CPWD - DSR 2021
- Jointly promoted by BMTPC and IPIRTI



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

COST-EFFECTIVE BRICKS, BLOCKS AND OTHER BUILDING COMPONENTS

Alternate to conventional burnt clay bricks.



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

M/s Eco Vision Industries is manufacturing cost effective building materials and products based on industrial waste i.e. flyash. The components being manufactured are flyash bricks, Flyash Cellular Light-weight Concrete Blocks & interlocking blocks, Ferrocement roofing channel and RCC plank and joist system. These materials and products are time tested and proven and need to be propagated for building construction as an alternate to burnt clay bricks / blocks / roofing options for sustainable development.

- **Fly-ash bricks:** Made out of 50% fly-ash- a waste from thermal power plant, cement/lime and sand. 100% replacement of burnt clay bricks.
- **Cellular Light Weight Concrete Blocks:** Made out of mixture of cement, water, fly-ash and preformed foam. Blocks are produced with a density of 250 Kg/cum to 1600 M/Cum.
- **Interlocking Compressed Earth/Fly-Ash Blocks:** The blocks replaces conventional bricks/blocks. Doesn't require sand-Cement mortar i.e., dry stack masonry is done/binding is through gravity/interlocking. Interlocking blocks have smooth & even finish on both sides thus saving on plaster.
- **RCC Planks and Joist System:** A precast concrete flooring/roofing system for single and multi-storey buildings. It consists of precast R.C. planks supported over partially precast R.C.C. joists. The completed floor/roof with 40 mm thick in-situ concrete filling forms the monolithic T-beam slab resting over walls. The system is developed by CBRI.





SALIENT FEATURES

- Building products are based on industrial by-product i.e. flyash
- Time tested and proven
- Energy Efficient and recyclable.
- Environmental friendly.
- Cost Effective and time saving.
- Creates local employment.
- Simple technologies which can be easily adopted by semi-skilled labor.
- Pre-fabrication in factory leads to better quality control.
- Do not require mechanical handling and erection equipment.
- Suitable technologies for PMAY(Urban/Rural).

ECONOMIC ASPECTS

- The cost of construction using cost-effective building materials is 10 to 20% less than the conventional load bearing construction.
- Moreover it is greener and sustainable development with reduced carbon footprints.
- Considerable reduction in use of cement and steel.



SUSTAINABILITY ASPECTS

- Energy Efficient, eco-friendly & Green Building components
- Fast-track construction technology to reduce time period of construction
- Use of local materials & technologies
- Use of waste products & technologies reducing the embodied energy
- Conservation of resource materials
- Durable
- Low life cycle cost
- Maximize use of local manpower, and renewed resources
- Low Energy Materials & Technologies
- No heavy equipment or sophisticated T&P required : Saves energy & fuel
- Less consumption of cement, Steel & aggregate : Saves energy
- No shuttering : Saves forest
- Flyash mixed in C.M : Saves cement & energy
- Flyash Bricks : Utilisation of waste product
- Savings in Embodied Energy
- No shuttering used - Saves wood & steel



SUITABILITY AND AVAILABILITY

- Suitable for all climatic conditions.
- Easily Available in various parts of the country.
- Lesser carbon footprint.
- Fly-ash bricks may not be easily available in areas where thermal power plants are at far distance.
- RCC planks and joist may not be suitable for rooms having larger span.





LIMITATIONS, IF ANY

- Strict quality control and assurance is required to produce building components
- Training of workforce is also necessary
- Characterisation of raw material and appropriate design mix along with quality of manufacturing greatly influence the quality of products.

MARKET LINKAGES

- The components can be locally cast near construction site.
- It can also be produced by small entrepreneurs and supplied to consumers at State/ Block/ village level

MAJOR PROJECTS

- Widely used in various projects throughout the country.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- IS 12894:2002 - Fly-ash bricks.
- IS 2185(Part 4) - 2008-Cellular Light Weight Concrete Blocks.
- IS 13994:1994 - RCC Planks and Joist System.



SALIENT FEATURES

- It displays higher tensile strength than many alloys of steel. It has capabilities for higher compressive strength than many mixtures of concrete.
- The high silica in bamboo makes it indigestible to termites.
- Bamboo wood flooring is an eco-friendly product Bamboo is by far the fastest growing natural resource in the world. It grows to maturity in just 4-5 years- in contrast to a tree which take decades to mature.
- Bamboo wood offers the sheen, durability and luxurious finish of hardwood—but without the ecological damage.
- The root system of bamboo continues to grow after harvesting preventing soil erosion and maintaining nutrients
- Bamboo plants release upto 30% more oxygen and absorb more CO2 than hardwood trees

ECONOMIC ASPECTS

- The bamboo based products are economical than hard wood based products and are green products.



SUSTAINABILITY ASPECTS

- Based on plantation timber bamboo
- Low green house gas emissions
- Low embodied energy
- Reduced carbon foot prints
- Higher strength to weight ratio
- Being bamboo based helps in CO2 sequestration
- Excellent thermal conductivity and sound insulation
- Bamboo being lighter in weight provides better seismic resistance.
- Based on local material generates local employment.

SUITABILITY AND AVAILABILITY

- Suitable to all climatic zones
- Suitable for interior and exterior use.
- Can be used as an alternate to hard wood based products for flooring, roofing, wall cladding, beams and columns, staircases, poles and other applications.

LIMITATIONS, IF ANY:

- Indoor products shall not be used for outdoor use and vice-versa
- There shall be difference in kind of finish for indoor and outdoor flooring.



MARKET LINKAGES

- Products are available Pan India and there are number of agencies manufacturing these products.
- Use of bamboo products is restricted to areas such as heritage buildings, tourist huts, iconic structures and therefore use of bamboo products in housing needs to be enhanced.

MAJOR PROJECTS:

- Samrat Ashoka Convention Center
- Guwahati Airport
- Godrej Bhawan, Mumbai
- Social Forestry Range, Dept. of Forest, Govt. of Tripura
- H.Q., BSF, Tripura
- NIT, Agartala
- PL Raju Construction Ltd., Karnataka
- S T Enterprises, Arunachal Pradesh
- IHHR Hospitality Andhra Pvt. Ltd., Hyderabad
- ONGC Ltd., Agartala
- Asian Construction Company, Mumbai
- Project of World Bank & Govt. of West Bengal, Digha

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Code ISO 9001:2008 – 14001:2004 – 18001:2007 Certified Company GRIHA
- Certified by BMTPC under PACS.



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

INSULATED PUR, PIR, MINERALWOOL, IPN/ QUADCORE PANELS

*Alternate to conventional bricks/blocks masonry wall
& non-load bearing roof.*



Scan QR Code for
Video

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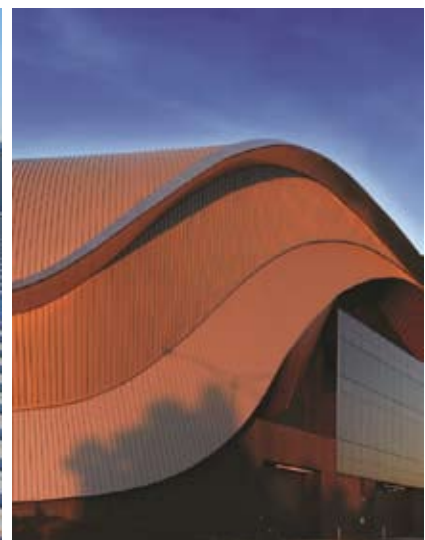
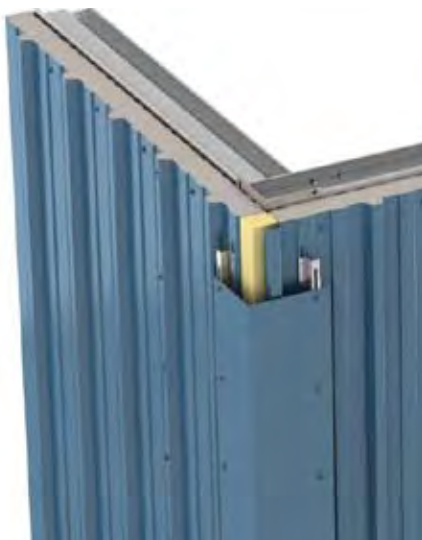


BRIEF

The Panels are manufactured in a fully automated continuous manufacturing production line & have pre-coated Galvanized Iron (GI) / Galvalume (GL) sheet on both side of insulating material such as Polyurethane (PUR) foam/ Poly Isocyanurate (PIR) /Mineral Wool & IPN /Quadcore insulation. The IPN(Nano) panel is recent advancement, with superior performance on fire, thermal, environmental and longevity aspects. These panels can be engineered to withstand a variety of internal and external conditions, for both interior and exterior use- such as walls as well as façades, ceilings as well as roof systems.

These panels are used for building cold store units, commercial units etc, which require specific interior climatic conditions & have now started being used in residential buildings also. These panels are being manufactured by the agency in Nalagrah and Indore Manufacturing facilities in the country.

The Kingspan Group is one of the global leaders in the design, development and delivery of advanced building envelope products and solutions, with 166 manufacturing sites worldwide.

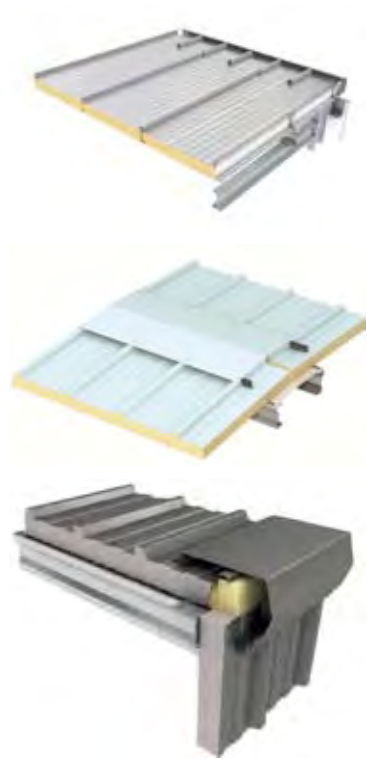
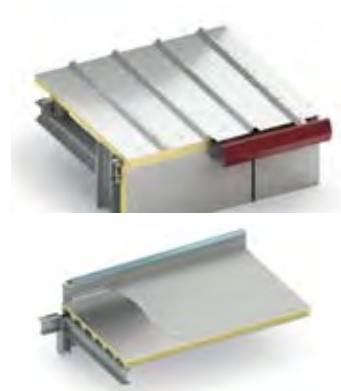
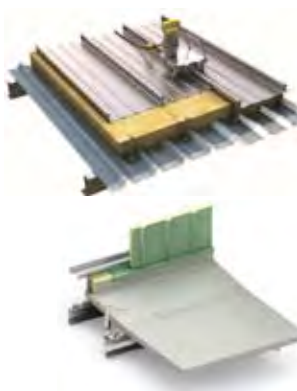


SALIENT FEATURES

- Comprehensive design choices are provided for distinct profiles integrating with each other & wide range of colors for visual impact
- Can be designed for any thermal, structural, acoustics and Fire performance.
- High level of design flexibility
- Panels are airtight & weather resistant.
- Pre-engineered, modular in size & facilitates quick installation.
- Easy to dismantle and transport from place to place as per the requirement.

ECONOMIC ASPECTS

- Reduced maintenance cost.
- Modular components reduce erection time.
- Being factory-produced component, the cost competitiveness depends on economy of scale.



SUSTAINABILITY ASPECT

- Energy Efficiency of specified/desired level
- Panel are CFC free and Zero Ozone depleting panel
- Panels can be recycled 100%

SUITABILITY AND AVAILABILITY

- Suitable for all climatic conditions.
- Panels can be supplied pan India. It comes with Standard width of is 1000 mm & Length as per the site requirement.
- At the time of designing the steel structure building, adequate vertical and lateral stiffness and strength needs to be provided with considering the wind loads, seismic forces etc. as per relevant IS code

LIMITATIONS, IF ANY

- The panels are non-load bearing in nature, & needs to be used/designed with structural framing system primarily with Steel structural system.



MARKET LINKAGES

- Pan India Availability

MAJOR PROJECTS

- VKNRL Nursing Hostel (G+2) Assam
- ITPO – Conventional Centre , Pragati Maidan- New Delhi
- COVID Hospital Centres
- Sub Health Centre in Prefab technology Various Locations, MP
- Sub Health Centre in Prefab technology Various Locations, Rajasthan
- Adani PV solar manufacturing Mundra- Gujarat
- NTPC - Joshimath

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Product Certified by BMTPC under PACS
- Product Certified by GRIHA



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

ECOPRO FIBRE CEMENT BOARD WITH LGSF SYSTEM

*Alternate to conventional RCC framed structure with bricks/blocks
as infill walling material.*



Scan QR Code for
Video

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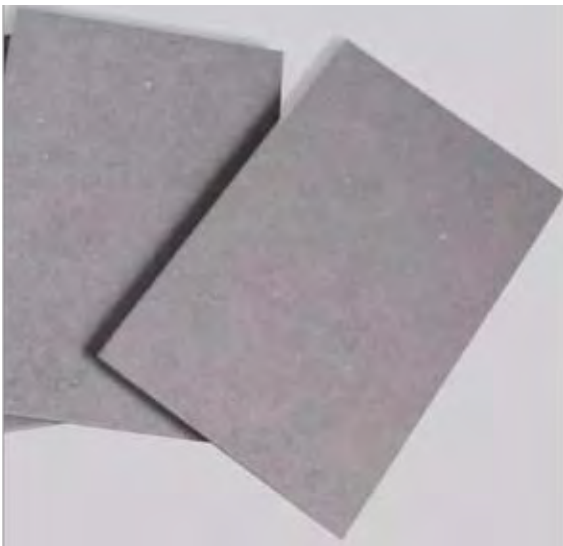
SAHYADRI
Indian. Innovative. Iconic.

BRIEF

It is a dry wall construction system with Light gauge steel framing (LGSF) & EcoPro Fiber cement boards, which can be used for External as well as internal walls.

EcoPro Boards are manufactured from a homogeneous mixture of cement, pozolana, a superior grade of cellulose fibre and binders of a siliceous base. It is lightweight, contains No VOC/ No Formaldehyde and is an A1 non-combustible weatherproof building board. External wall consists of 9 mm EcoPro HSB with 8 mm thick EcoPro designer Planks, and internal wall with 8mm EcoPro Plus board and 12.5 mm gypsum Board. Wall cavity is filled with 48kg/m³ density mineral wool insulation. For False ceiling, Grid with 595mm x 595mm EcoPro tiles can be made. The floor/roofing metal sheet comes with under deck glass wool Insulation.

The system application areas include commercial, residential, educational institutes, public utility, hospitality spaces etc.



SALIENT FEATURES

- System is a speedy, innovative and a sustainable building solution to enable cost-effective & quality construction
- Being a dry construction, no plastering or curing is required, hence amounting to huge savings of water, sand etc.
- Structure being light, does not require heavy foundation
- Panels & Structural elements can be transported to any place including hilly areas to remote places easily and structure can be erected fast
- Structure can be shifted from one location to other without wastage of materials
- Good thermal insulation can be achieved
- The system is earthquake & cyclone resistant

ECONOMIC ASPECTS

- Cost Effective.
- Reduces construction time significantly
- Do not require skilled manpower.



SUSTAINABILITY ASPECT

- Saves Water
- Steel can be recycled multiple times
- Reduces cooling load.

SUITABILITY AND AVAILABILITY

- Suitable for all type of climates
- Availability is across the Country

LIMITATIONS, IF ANY

- Electrical cables need to be properly insulated with mini circuit breakers
- The labors are required to be trained for fabrication/assembly works
- Plumbing & electrical services need to be pre-planned



MARKET LINKAGES

- Pan India Availability

MAJOR PROJECTS

- Skill centre ,Uttarakhand – 5,200 sqmt.
- The Roots Resort, Panvel, Maharashtra - 10,000 sqmt (Seven star hotel with 40 rooms).

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- TUV Austria Certified



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

S3 PRE-ENGINEERED HOMES COMPRISES OF WALL & FLOOR PANELS CONSISTING OF CORRUGATED SHEET IN BETWEEN TWO CEMENT FIBRE BOARDS



Scan QR Code for
Video

Alternate to conventional bricks/blocks masonry wall & Non load bearing roof

CONTACT DETAILS

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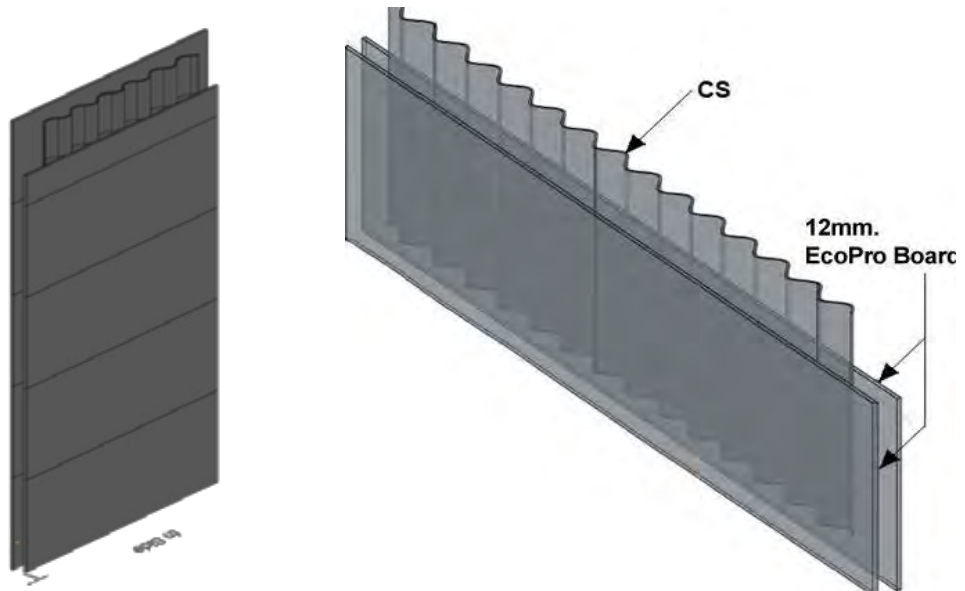
BRIEF

The system mainly comprises of a beams and columns assembly constructed as per the design of the building unit, with wall panels, flooring panels/ roof panels constructed using corrugated sheets in between two outer flat sheets. The wall panels are ventilated from top to bottom and improve livable condition of user in terms of heat, fire and sound.

The prefabricated modular construction system supports transportation, and assembling in almost any terrain. The multi-layered wall panels are quick to assemble and durable.

The system is particularly suitable for individual single storied scattered houses in affordable housing segment.

The system has been developed in the R&D Lab of the Agency in the year 2019 with Patent applied.



SALIENT FEATURES

- S3 is a speedy, innovative and a sustainable building solution to enable cost-effective & quality construction.
- Being a dry construction, no plastering or curing is required, hence amounting to huge savings of water and sand.
- Three Layered Hybrid Wall for good thermal Insulation with Leak proof wall.
- Can be used for both Interior and Exterior walls.
- Very much suited for difficult hilly terrains and sites.
- Semi-Skilled Labours can also execute the Job.
- Strong and lightweight.
- Termite resistant, Fire resistant & Earthquake resistant.

ECONOMIC ASPECTS

- S3 structures can reduce the total construction time by almost 70% - 80% allowing faster occupancy and earlier realization of revenue.
- Essentially pre-engineered/ factory made, cost competitiveness depends on economy of scale.
- Mainly formed by standard sections and inter-changeable parts making the construction process simple.
- Less wastage, less time in designing, erecting, transportation and less variation between estimated and actual cost.



SUSTAINABILITY ASPECTS

- S3 wall panels eliminate the use of bricks completely, hence helping in the conservation of cultivable topsoil.
- The wall panels are made up using 30% fly ash, which is the waste of Thermal Power Station.
- It uses slopping roof concept & does not create heat island effects caused due to concrete slab, which is in line with UNFCCC guidelines on Global warming.
- Reduced water requirements in construction (No plastering and curing required)
- Minimise air pollution considerably since these are essentially factory made homes

SUITABILITY & AVAILABILITY

- Suitable for all climatic conditions
- Plants across Western and Southern India
- Production capacity of 50,000 MT of roofing materials and 8000 MT of cement boards every month.

LIMITATIONS, IF ANY

- Recent development, requires further evaluation/ certification of structural integrity of the system.



MARKET LINKAGES

- Can be supplied pan India

MAJOR PROJECTS

- Various locations in Kerala

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Various Tests have been conducted at College of Engineering Pune
- S3 has been applied for Patent under application no. 201921022801 dt. 08/06/2019.



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

PREFABRICATED BUILDING TURNKEY SOLUTION PROVIDER

*Alternate to conventional RCC framed structure with bricks/blocks
as infill walling material.*



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

The Agency, is one of the leading prefabricated structure manufacturers offering innovative solutions for off-site building construction and easy installation on-site, in the areas of;

- Pre Engineered Steel Building system
- Light Gauge Steel Frame (LGSF) System
- Insulated Sandwich Panels.

The light Gauge Steel Framed Structures (LGSF) is based on factory made galvanized light gauge steel components. The components/sections are produced by cold forming method and assembled as panels at site forming structural steel framework of a building of varying sizes of wall and floor. The assembly is done using special types of screws and bolts. LGSF is typically ideal for one to four storey high buildings, especially for residential and commercial buildings & for buildings higher than G+3, it can be used with hot rolled Steel sections. Again, pre-engineered steel (hot rolled steel) sections are preferred for buildings with high spans. Insulated sandwich panels produced are in the form of PUF /EPS/ ROCKWOOL / GLASSWOOL based walling & roofing panels. Lightweight, durable, re-locatable, economic and energy efficient, prefabricated structures and buildings are in demand and have been the favoured alternative to conventional construction methods of late. With a wide range of benefits and advantages, prefab buildings serve every function of traditional structures and offer added benefits.



SALIENT FEATURES (LGSF & PRE-ENGINEERED STEEL SYSTEM)

- LGSF has high strength to weight ratio. Due to light weight, significant reduction in design earthquake forces is achieved. Chance of progressive collapse is marginal due to highly ductile and load carrying nature of closely spaced studs/joists
- Fully integrated computerized system with Centrally Numerical Control (CNC) machine primarily employed for manufacturing of LGSF sections provide very high Precision & accuracy upto 1 mm
- The speed of construction is very high.
- Structure being light, does not require heavy foundation
- Structural element can be transported any place including hilly areas to remote places easily and structure can be erected fast
- Structure can be shifted from one location to other without wastage of materials
- With LGSF, the load bearing construction upto G+3 can be designed, however stories higher than G+3, Pre-engineered steel (Hot rolled) need to be employed as primary structural member.
- Buildings with high span, Pre-engineered steel (Hot rolled steel) sections are preferred.
- Steel sections are manufactured in factory under strict quality control, which brings quality & resource efficiency
- Steel used can be recycled multiple times

SALIENT FEATURES (INSULATED SANDWICH PANELS)

- Can be designed for any thermal, structural, acoustics and Fire performance.
- High level of design flexibility
- Panels are airtight & weather resistant.
- Pre-engineered, modular in size & facilitates quick installation.
- Easy to dismantle and transport from place to place as per the requirement.



ECONOMIC ASPECTS

- Reduced construction time.
- Lower building maintenance cost.
- Lower operational energy cost due to insulated sandwich panel.

SUSTAINABILITY ASPECT

- Extended Building Life span.
- Insulated sandwich panels brings improved thermal efficiency resulting in lower operational energy consumption
- Less waste generation during building construction process.
- Both Steel & sandwich panels are 100% recyclable

SUITABILITY AND AVAILABILITY

- Suitable for all kind of climates.
- Providing Services Pan India.

LIMITATIONS (IF ANY)

- The labors are required to be trained for fabrication/assembly works
- Plumbing & electrical services need to be pre-planned



MARKET LINKAGES

Available across country.

MAJOR PROJECTS

- Terminal Building Construction for Hindon Airport, Darbhanga Airport, & Chitrakoot Airport, in Ghaziabad, Dharbhanga, Chitrakoot respectively for Airport Authority of India.
- G+5 Commercial Building in The Janpath Hotel for CPWD in New Delhi
- G+5 School Building for Aster Public School in Greater Noida
- Logistics Park for AVG Logistics in Agartala
- Industrial Shed for Jupiter Laminators in Sonipat
- IT Park for Perfect IT in Noida
- Complete Site Infra Solution for L&T in Mumbai

CERTIFICATIONS/INDIAN STANDARD/ENDORSEMENT

- GRIHA
- ISO 9001, ISO 14001
- Quality Management System
- Environment Management System



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

COST EFFECTIVE INNOVATIVE HOUSING TECHNOLOGIES

Various Alternatives to conventional walling & roofing system



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

In order to use and adopt Cost Effective Building Materials and Technologies developed by various R & D Institutions across the Country, Government of Karnataka took an initiative to set up an apex centre called "KARNATAKA RAJYA NIRMANA KENDRA (KARNIK).

KARNIK has the following primary objectives:

- To monitor, oversee, supervise and guide the Building Centre's (Nirmithi Kendras) activities in the State, set up in the various districts of the State
- To promote Cost-effective, Environmental Friendly, Alternative Building Materials and Technologies through the network of Nirmithi Kendras & Training on these technologies
- Providing guidance to Government on emerging housing concepts and policy options from time to time.
- Developing replicable housing infrastructure models.

Various innovative & cost effective technologies/products promoted through Nirmati Kendras, include;

SALIENT FEATURES

- **Stabilized Mud Blocks for walling:** Blocks based on soil stabilized with suitable quantity of binder (cement/lime), being promoted for housing construction. These blocks have significantly lower embodied energy & are cost effective as compared to ordinary burnt clay bricks.
- **Funicular Shells:** A roofing system consists of doubly curved shells made with materials of good compressive strength such as waste stone pieces and brick tiles and supported on reinforced





concrete edge beams. It uses locally available waste stone, normally available from stone cutting and polishing unit.

- **Ferrocement Channels & Trusses for Roofing:** The building system uses pre-cast ferrocement roofing channels of a segmental arch profile which are placed adjacent to each other and spanning over two supports. Ferrocement comprises of a uniform distribution of reinforcement by use of chicken wire mesh and welded mesh encapsulated in rich cement mortar, thereby achieving significant reduction in both steel reinforcement and dead weight of roof. Similarly, Ferro cement trusses support structurally the sloping roof.
- **Filler Slab for Roofing:** It is a roofing system in which the concrete from bottom portion of the floor/ roof slab is replaced with filler material such as easily available & cost-effective options of local bricks, light weight materials, tiles, clay pots/ kullars, etc. The principle is that concrete is structurally not required in bottom half, as it is a compression material/ member & is required in top half of the slab. This results in resource efficiency & cost-effectiveness.
- **Jack Arch for structural masonry over openings as alternate to lintel/ beam:** A jack arch is defined as a structural element in masonry construction that provides support at openings in the masonry. Unlike regular arches, jack arches are not semicircular in form. Instead, they are flat in profile and are used under the same circumstances as lintels. No steel is required for the construction.
- **Hollow concrete blocks/ Interlocking blocks for walling:** The concrete blocks are made out of lean concrete mix with low cement content. The embodied energy of concrete blocks are lower as compared to ordinary burnt clay bricks. The interlocking blocks require very little /nil mortar as compared to normal blocks. This is a suitable product if sand & aggregates are available locally & cheap.
- **Fly ash based Bricks/ blocks/ Interlocking blocks for walling:** Fly Ash bricks comprises of Fly Ash, a by-product from Thermal power plant as major ingredient (> 50% of raw material), lime/cement, sand, gypsum etc. This product is being primarily promoted by specialized Nirmithi Kendra namely Centre for Ash Utilization Technology and Environment Conservation(CASHUTEC).

Apart from above, there are several other cost-effective products/ technologies being promoted by various Nirmithi kendras in the State.





ECONOMIC ASPECTS

- One important aspect of promoted technologies/ products are reduction in cement & steel consumption with cheaper & locally available materials, thereby reducing the cost of construction
- Machineries/ techniques used are generally simple, therefore any person can be trained with little efforts for the construction job, thus providing local employment.

SUSTAINABILITY ASPECT

- Replacement of cement & steel with locally available resources reduces the energy consumption.
- Avoids the use of burnt clay bricks, thus reduces the Green House gas emissions due to burning of fossil fuels & preserving the top fertile soil for agricultural purpose

SUITABILITY AND AVAILABILITY

- Products/ technologies are suitable for the State of Karnataka as Nirmithi kendras are operating in the State only & available across the State to provide technological solutions.

LIMITATIONS (IF ANY)

- Technology/ products solutions are available in the State of Karnataka primarily.

MARKET LINKAGES

- Technological solutions are available across the State of Karnataka.





MAJOR PROJECTS

Several Projects by various Nirmithi Kendras in the State of Karnataka using innovative & cost effective products/technologies, include;

- Houses by Mysore Nirmithi Kendra, Mysore (using Stabilized Mud block)
- Ambedkar Housing- Koppal (Funicular Shells)
- Koraga Housing, Mangalore (Ferrocement Trusses)
- Administrative Block, Fisheries Dept., Mysore (Ferrocement Channels)
- Private Residence, Shivamogga (Filler slab)
- B.D.A.A Indoor Sports Complex At Bellary (Fly Ash Inter-Locking bricks)
- Bengaluru Rural Nirmithi Kendra Admin Block
- Slum Housing Bangalore (Jack Arch)
- Skill Department Project Up- Gradation of ITI Colleges In Karnataka – Refurbishment of existing Tech Lab
- Specialized works (Alur Bhavan at Dharwad, Gurukul Houses, Repairs & Renovation to Kannada Samuchhaya, Bellary etc.)

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Various innovative products/ technologies have been developed by R&D Organizations/ Technical Institutions etc., & covered with standard specifications/ Codes. KARNIK & Nirmithi Kendras are bodies functioning under State Government of Karnataka



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

LGSF STRUCTURES (HABINEST) & PUF SANDWICH PANEL (NESTUDIO)

Alternate to conventional RCC framed structure with bricks/blocks as infill walling material and conventional bricks/blocks masonry wall & Non load bearing roof



Scan QR Code for
Video

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BRIEF

Light Gauge Steel Frame Structure (HabiNest)

Light Gauge Steel Framed Structures (LGSF) is based on factory made galvanized light gauge steel components. The components/sections are produced by cold forming method and assembled as panels at site forming structural steel framework of a building of varying sizes of wall and floor. The assembly is done using special types of screws and bolts. LGSF is typically ideal for one to four storey high buildings, especially for residential and commercial buildings & for buildings higher than G+3, it can be used with hot rolled Steel sections.

The flooring / slab can be with deck sheet supported on floor joists with in-situ reinforced concrete on the top or in-situ conventional RCC slab. Wall cladding used (high density cement fiber board, concrete panels etc.) shall resist the wind load & conform to the functional requirements.

The sequence of construction comprises of foundation laying, fixing of tracks, fixing of wall panels with bracings as required, fixing of floor panels, fixing of roof panels, decking sheet, fixing of electrical & plumbing services and finally fixing of insulation material & walling panels.

HabiNest LGSF (Light gauge steel frame) construction is based on factory made Galvalume (AZ 150) light gauge cold formed steel of 550 Mpa, assembled as panels at site forming structural framework of a building of varying sizes of wall and floors. As these are light in weight requires a nominal civil foundation and excellent earthquake resistance making it ideal for building in difficult terrains such as mines.

- Structural Members (LGSF) consist of Mild steel Galvanized Structure with the yield strength not less than 550 MPa and a Zinc and aluminium coating AZ 150. The Size and thickness will be based on design criteria
- Roofing (Pitched / Flat roof) : With PPGL .45 mm sheet and 50mm insulation / with 0.8mm deck sheet and 75mm concrete flooring
- Boarding: 2 layers of High-density Fiber cement boards (6 mm + 9mm HD FCB) external 2 layer of fiber cement board and gypsum board internal (8mm FCB + 12.5mm Gypsum) all with 100mm rock wool insulation.





PUF Sandwich Panel (Nestudio)

Sandwich panels are single piece, prefabricated, modular, factory made units which consist of an insulating layer of rigid polyurethane foam between two layers of metal sheets. The panels comprise of PUF bonded between two sheets of Pre-coated GI sheets of 0.5 mm thick to produce straight-to-finish panels.

Insulation core provides effective insulation and strong bonding for better structural stability to facilitate higher loading and wider spans.

- 0.5mm Sandwich panel, RMP wood coated steel, 60mm thickness panel filled with PUF, ensuring fire, acoustics, and thermal insulation.



SALIENT FEATURES

Light Gauge Steel Frame Structure (HabiNest)

- As these are light in weight requires a nominal foundation.
- High earthquake resistance making it ideal for building in difficult terrains
- Cost effective & high speed of construction.
- Steel is recyclable, making it environment friendly
- High thermal insulation & acoustics can be achieved.
- LGSF (HabiNest): Lightweight structure performance is very good in high earthquake zone (projects done in north east)
- Designed for suitable wind speed (completed cyclone shelter in high cyclonic zone like Odisha).
- Environmentally friendly (very less water usage)
- Superior insulation property





PUF Sandwich Panel (Nestudio)

- Cost effectiveness : Overall life cycle cost is lesser than RCC
- Resource efficiency (saving of natural resources like sand, limestone water etc): Eco-friendly technology, leading to almost zero pollution.
- Quality & durability: High quality steel. Structures designed for 25years of life and can be designed for 50+ years too.
- Environment friendliness including use of Agro-industrial wastes and sustainable technology
- Ease of Working : Very easy to execute
- Energy efficiency: High on energy efficiency and can also be integrated with solar panels.
- Speed in construction: Very high speed of construction as compared to RCC construction.

ECONOMIC ASPECT

- Reduced structural load requirements.
- Reduces construction time.
- Overall life cycle cost is lesser than RCC
- Environment friendliness including use of Agro-industrial wastes

SUSTAINABILITY ASPECT

- Uses very less water
- Uses recyclable materials
- High thermal insulation reduces cooling loads.

SUITABILITY AND AVAILABILITY

- Suitable for all climate conditions.
- Available across the Country.





LIMITATIONS, IF ANY

- a. PUF Panel (Nestudio): NA
- b. LGSF (HabiNest): Lightweight structure best performance in high earthquake zone (projects done in north east). Designed for suitable wind speed (completed cyclone shelter in high cyclonic zone like Odisha

MARKET LINKAGES

- Pan India Availability.

MAJOR PROJECTS

- PUF Panel (Nestudio): 100+ Projects all across India, ranging from 200SFT to 6000SFT independent houses.
- LGSF (HabiNest) : > 1.5 lakh Sq.ft already executed in various locations across India. More than 3 lakh Sq.ft work under execution.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- HabiNest is certified by IIT.



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

SANDWICH PANEL USING INSULATION CORE

*Alternate to conventional bricks/blocks masonry wall &
non load bearing roof*



Scan QR Code for
Video

CONTACT DETAILS

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Nelson Manickam Road, Chennai-600029

E-Mail : vinayak.dave@metecno.in

Mob: +91-7338836006



BRIEF

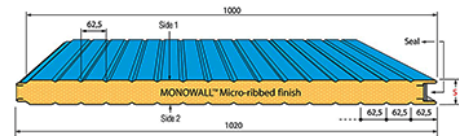
High quality factory produced insulated Sandwich Panels using PUF (Polyurethane foam), PIR (Polyisocyanurate foam) and Mineral Wool (Rockwool) as core insulation. The panels come with both walling & roofing options with brand names as Glamet, Monowall, Frigowall, Hipertec Roof & Wall & Super walls for various commercial, industrial & residential options.

The HIPERTEC ROOF panel is manufactured in accordance with a system patented by Metecno, consists of a profiled external steel sheet and an internal micro-ribbed steel sheet, with an insulation core of orientated fibre high density Rockwool, arranged perpendicularly to the plane of the panel and positioned in strips, laid longitudinally with off-set joints and transversely compacted, in such a way as to completely fill the space between the metal facings.

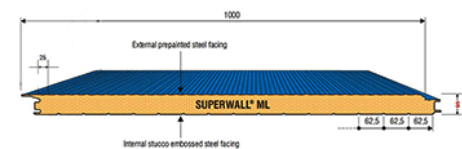
The insulated panel consists of two facings of relatively thin metal sheet profiled preferably and of high strength enclosing a core, which is relatively thick and light but has adequate stiffness in a direction normal to face of the panel. The facings are of steel or aluminium. The core is made of polyurethane PIR mineral wool.

The advantages of insulated panel of factory assembled insulated panels are as under roofing or walling are as under:-

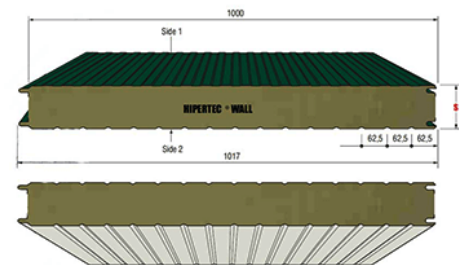
- Excellent and durable thermal insulation
- Good sound insulation w High load bearing capacity at less weight
- Absolute water and vapor barrier
- Easy repair and replacement in case of damage
- Reasonable fire reaction and resistance



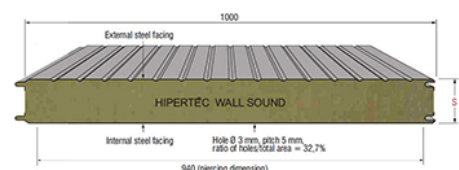
Monowall Wall Panel



Superwall Wall Panel



Hipertec Wall Panel



Hipertec Wall Sound Panel

SALIENT FEATURES

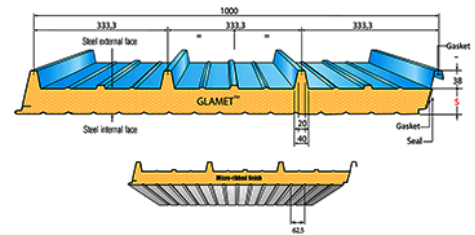
- Insulated panels help in increasing energy efficiency of the building & reduce energy consumption.
- Panels are also available with high degree of resistance to fire and acoustic. Also comes with the option of high aesthetic appearance.

ECONOMIC ASPECTS

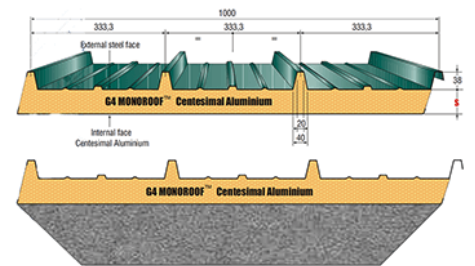
- Long life and very low maintenance cost
- Easy to transport, install & quick construction process.

SUSTAINABILITY ASPECT

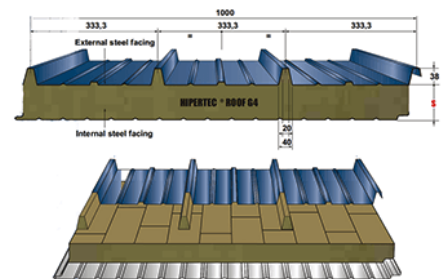
- No greenhouse emissions during production or installation.
- Excellent air tightness and free of thermal bridges which results in considerable energy savings.



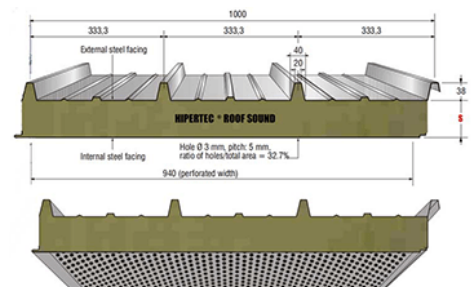
Glamet Roof Panel



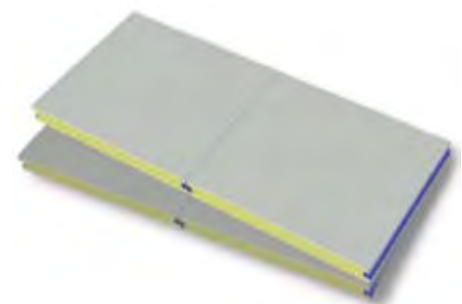
Monorooft Roof Panel



Hipertec Roof Panel



Hipertec Roof Sound Panel



SUITABILITY AND AVAILABILITY

- Capacity for rapid erection without lifting equipment, easier installation in hostile weather conditions
- The panels are supplied through-out the country, and also exported to various South- Asian countries.

LIMITATIONS, IF ANY

- The process/ technology have been implemented with technical collaboration with the principals in Italy. These panels are secondary members, and require the support of primary members to provide the wall and roof cladding solutions.

MARKET LINKAGES

- Easily Available



MAJOR PROJECTS

- Arvind Mills Project –Gujarat, 2019, FANUC, Bengaluru, 2020
- Tata Smartfoodz, Tada, 2020
- Kirby – PGCIL : Pugulur (T.N) and Raigarh (C.G), 2018/19
- NIFT, IRCON, NBCC, Maharashtra
- BGR- Power Plant Projects

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- PAC by BMTPC for Rock-wool and PUF panels.
- ISO 9001:2015 Certified
- CBRI & CIPET tested
- Panels tested for Fire-rating in NABL Laboratory



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

MAGICLITE HOUSE

Alternative to conventional bricks/blocks masonry wall



Scan QR Code for
Video

CONTACT DETAILS

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Mob: 9967870753



BRIEF

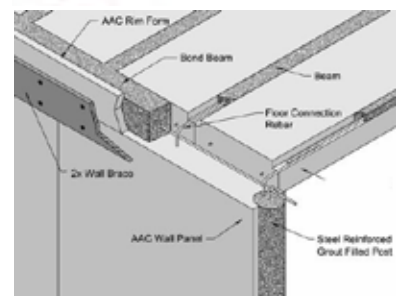
MagicLite ALC Wall Panels are reinforced with corrosion-protected steel, making it a lightweight yet heavy-duty product. With great success in global markets, the ALC Wall Panel technology offers durable & high-quality construction in the shortest possible time.

It has the high thermal rating in the industry (K-value: 0.16). Its cellular structure provides a well-insulated interior, keeping indoor cool in summer & warm in winter. According to some studies, it is found to have conserved up to 30% in air-conditioning bills.

MagicLite Panels are highly resource-efficient, ensuring low environmental impact. The panels have close air pockets that result into excellent sound insulation, adequately suppressing the outside noise. In addition, its 4-hour fire rating allows for thinner wall sections, thereby increasing floor space for the end-user. They come in full height lengths (from floor to ceiling) with varied thicknesses and are 600 mm wide.

The reinforcement in the panels provides additional flexural strength to the product, and hence even larger heights, there is no issue of deflection, warping, buckling effect.

Construction cost is mainly bifurcated into two parts: Material Cost and Labour Cost. The best option for budget homes is to reduce the labour cost by utilizing techniques that can reduce the project timelines. Trying to reduce the material cost might have an implication on the quality.



SALIENT FEATURES

- Thermally Insulated, Fire Resistant, Earthquake Resistant, Noise Pollution Resistant, And Water Resistant.
- Green Building material with High Strength.
- Resource efficient, about 70% reduction in raw material usage.
- No need for plastering and curing at site.
- Excellent thermal efficiency about 30% energy saving.
- High acoustic insulation with a sound reduction index of more than 40 db.
- Low manpower requirement, can be installed by Semi-skilled workers.

ECONOMIC ASPECTS

- Reduced manpower requirements.
- Resource and Time efficient.



SUSTAINABILITY ASPECT

- MagicLite Panels are Recyclable, inert & non-toxic.
- High Energy saving.
- Excellent life-cycle cost.
- Supports LEED credits.

SUITABILITY AND AVAILABILITY

- Suited for all weather conditions.
- ALC Wall Panel technology offers durable & high-quality construction in the shortest possible time.

LIMITATIONS, IF ANY

- MagicLite House can be used for Load Bearing Structures of not more than G+2.

MARKET LINKAGES

- Available pan India.



MAJOR PROJECTS

- L&T Constructions, Godrej, Mahindra,
- Lodha, Alembic, Advent Construction Ltd.,
- Kalpatrau Puranics, Global Warehouse Solutions, Panoli intermediates.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Yet to be certified



Qingdao Research Institute,
China



Zhengzhou University,
China



Zhongana Stone Square,
China



Hotel Ramada,
Phuket



Hotel Landmark Waterfront,
Thailand



Chaing Mai Hospital,
Bangkok



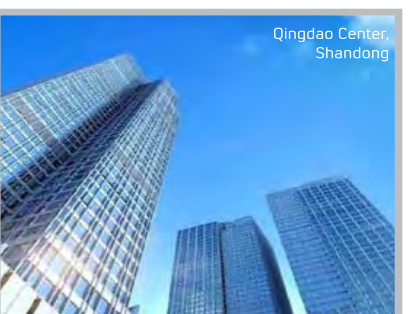
Hangzhou Bingjiang,
China



Siam Paragon,
Thailand



Jinji Xiaolu Project,
China



Qingdao Center,
Shandong



Marine Equipment Center,
China



Nanyang News Center,
Henan

CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

3D MONOLITHIC CONCRETE CONSTRUCTION USING ALUMINIUM FORMWORK

*Alternative to conventional RCC framed structural system with
bricks/blocks as infill walling material*



Scan QR Code for
Video

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Mob: 9702020901



BRIEF

Monolithic Concrete Construction technology intends to replace the conventional steel/plywood shuttering (formwork) system with customized engineered formwork which is manufactured in the factory set up under controlled conditions. In this system, in place of traditional RCC framed construction of columns, beams and infill walls; all walls, floors, slabs, stairs, including columns & beams (as per design requirement) together with door and window openings are cast-in-place monolithically using appropriate grade of concrete in one operation. The especially custom designed modular formwork is used for the purpose which facilitates easy handling with minimum labour & without use of any equipment. Being modular formwork system, it enables fast construction of multiple/mass modular units.

The modular aluminum formworks are made of lightweight Aluminium. The fixing of the formwork is done using tie, pin & wedges system. It does not require very skilled labour to do the job.

The wall is designed as shear wall. The grade of concrete, wall & slab thickness, detailing of reinforcement are based on structural & functional requirements of the building in accordance with relevant Indian Standards/ National Building Code.

The Agency provides technology support to various construction/project implementing Agencies.



SALIENT FEATURES

- Facilitates rapid construction of multiple/ mass modular units (similar units). A construction cycle for one house was demonstrated to be only 7 days, in a remote village of Karnataka.
- The Walls are constructed using Self Compacting Concrete (SCC) & Slab using Smart Dynamic Concrete (SDC), the Concrete to conform to IS 456, IS 10262
- Results in durable structure with low maintenance requirement
- The precise finishing can be ensured with no plastering requirement
- The concrete can use suitable industrial by-products resulting in improved workability & durability, while also conserving natural resource
- Being Box type structure, highly suitable against horizontal forces (earthquake, cyclone etc.)
- No joints in construction helps avoid the possibilities of leakage/seepage

ECONOMIC ASPECTS

- The large number of similar units brings economies of scale.
- High speed of construction reduces project duration & related project overheads
- Reduced wastage during construction.



SUSTAINABILITY ASPECTS

- Reduced environmental pollution during construction as generally large requirements of concrete are met with RMC Plants or Batching Plants
- The concrete can use industrial by-products such as Fly Ash, Ground granulated blast furnace slag (GGBFS), Micro silica etc. resulting in improved workability & durability, while also conserving natural resource

SUITABILITY & AVAILABILITY

- Technology is suitable for Smaller / Modular/low rise/high rise buildings, and affordable mass housing
- Proper planning for heat insulation and air ventilation in the housing units needs to be ensured through proper orientation, shedding etc. (refer IS 3792:1978 for guidance)

LIMITATIONS, IF ANY

- Post construction alterations are difficult.
- All the service lines are to be pre-planned in advance.
- A lead time of about 3 months is required for initiation of work, as the formwork are custom designed, manufactured and prototype approved before manufacturing required number of sets of formwork.



MARKET LINKAGES

- Formwork may be made available in any part of the country.

MAJOR PROJECTS

Technology Support for:

- Cluster of EWS Houses – 350 Nos. in Bangalore rural district & 230 Nos. near Kanakapura, Karnataka, for Karnataka Housing Board, Govt of Karnataka by Rajeev Gandhi Housing Corporation Ltd.
- More than 600 houses in various locations (Mysore, Bangalore, Tumkur & K.R.Pet) In Karnataka for State Police housing Corporation by M/s PG Shetty Constructions
- 463 houses handed over in 2 location about 200 are in progress in Land slide victims Kodagu district, Karnataka

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Wall is designed as shear wall as per relevant Indian Standard (IS 456)
- Construction Industry Development Council presented the CIDC Vishwakarma Award in 2013 in Recognition of the efforts of UltraTech Cement in promoting this Technology.



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

SOLAR ROOF PANEL (ATUM- POWER GENERATING ROOFING SOLUTION)

Alternate to conventional roofing system.



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

ATUM is the integrated solar roof, which generates electricity and is a completely integrated, seamless solar roof. It is made of cement board, solar cells, toughened glass and aluminum profiles & sealants & presently available in the size of 1975 mmx 1005 mmx17mm. The product has been developed in the year 2018-19 in Secunderabad, Telangana by the Agency & has applications in individual houses, farmhouses, school, institution, commercial buildings, industries etc.

ATUM APPLICATIONS (RESIDENTIAL)





SALIENT FEATURES

- It is an integrated product which works as a roof and a solar panel.
- ATUM uses GreenPro Certified material which makes it a highly sustainable, reliable, and safe solar roof.
- It is a Leak proof application, which is water, fire, termite & shock resistant.
- Generates 20-40% extra power than traditional solar panels in the same space.
- The electricity generated and used can be easily tracked live on the ATUM App on smartphones.
- A Class fire rated and designed to take wind speeds of over 250 kmph making it hurricane proof.
- It is especially suited to far-flung hilly terrain, difficult areas & rural areas, not connected with electricity network.
- Insulates noise from roof during rain and also keeps the interior cooler in summer.

ECONOMIC ASPECTS

- Being factory-produced component, the cost competitiveness depends on economy of scale.
- ATUM can generate 1 kW in 67 sq ft whereas in case of traditional solar rooftop it is 100 sq ft per kW. Given ATUM's better space utilisation, the electricity generated is at least 20% higher than any other solar roof.





SUSTAINABILITY ASPECTS

- The durable roofing option coupled with power generation based on renewable resources, make this product highly sustainable.
- Payback period of the roof is within 6 years. More than 4 times return on investment over 25 years.
- Non-corrosive property and resistant to water and fire.
- Being an electric roof with a cement substrate, ATUM minimises heat transfer into the building. This in turn, reduces the building's energy usage as compared to a traditional sloped concrete roof or industrial Galvalume roofing.

SUITABILITY & AVAILABILITY

- Suitable for all climatic conditions.
- Pan India distributors/ dealers' network.

LIMITATIONS, IF ANY

- Can take live loads upto 600 kgs only.





MARKET LINKAGES

- As distributors/ dealers' network is available Pan-India, the product can be supplied anywhere in the country.

MAJOR PROJECTS

- Rainbow Hospital, Hyderabad,
- Srinidhi foods, Tamilnadu
- KhorFakkan Mosque, UA,
- SonamWangchuk battery house, Ladakh
- Individual Houses, Farm Houses, School Building, Industries etc.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Granted 20 years patent by India Patent Office and South Africa Patent Office for "Eco-Friendly Energy Generating Roof."
- UL Certification as per International Electro technical Commission (IEC) standards.
- Certified by the Campbell Corporation, to take a uniform load of 780 lbs per sqft, a snow load of 2200 lbs, and the jointing mechanism is a patented leak proof system as per American Society for Testing and Material (ASTM) Standards.
- BIS certification (IS 14286: 2010/ IEC 61215: 2005, IS/IEC 61730 (Part 1): 2004 & IS/IEC 61730 (Part 2): 2004 for the product i.e. Crystalline silicon terrestrial Photovoltaic (PV) Modules (Poly-crystalline)



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

CEMENT BOARD SANDWICH PANEL (V PANEL)

Alternate to conventional walling system



Scan QR Code for
Video

CONTACT DETAILS

M/s Visaka Industries Ltd.

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Secunderabad-03, Telangana

Email:- Manish.kumar@visaka.in

Mob: +91-9811771317



BRIEF

Cement Board Sandwich Panel (V panel) is ready to use wall panels having core filled with EPS granule based concrete with Vnext Boards as facing sheets. The panels can also be manufactured through Autoclaving process. The Cement fibre boards with GI Studs, can also be filled with in-situ EPS granule based concrete at site. This is a user-friendly alternate to conventional walls. This presently comes in three variants – 50 mm, 75mm & 100mm in thickness with standard width of 600mm and lengths of 2400/2700/3000/3300 mm. The panels can be used as ready-to-fix dry walls and are compatible with the existing doors and windows system.

It is ready to install panels primarily for non-load bearing walls, which can be used for construction of individual pre-fabricated houses/buildings, internal partitions, external walls, compound walls, etc. With a unique, semi-circular tongue and groove, installing V Panels is quite simple. V Panels are energy-efficient building products that are non-combustible and their tested for fire and toxicity ratings. The product has been developed by the agency in the year 2010-11 at Secunderabad, Telangana.

V Panels possess all the benefits of a masonry wall, but as a slim and dry wall application, they ensure clean working site conditions and offers more floor space. V Panels are robust and have a smooth surface that accepts various kinds of surface finishes like veneer, paint and textures.



DEMONSTRATION HOUSING PROJECTS (DHPs) under PMAY(U)

NELLORE, ANDHRA PRADESH



PROJECT PROFILE

- No. of houses : 36 (G+1)
- One Community Building in an area of 6900 sq.ft.
- Usage: Social welfare activities
- Technology: Glass Fibre Reinforced Gypsum (GFRG) Panel System

HYDERABAD, TELANGANA



PROJECT PROFILE

- No. of houses : 32 (G+3)
- Usage: Training Hostel
- Technology: Structural stay in place steel formwork system - (16 DUs)
Light Gauge Steel Framed Structure (LGSFS) - (16 DUs)

DHPs under PMAY(U) : 256 demonstration houses constructed

DEMONSTRATION HOUSING PROJECTS (DHPs) under PMAY(U)

BHUBANESHWAR, ODISHA



PANCHKULA, HARYANA



PROJECT PROFILE

- No. of houses : 32 (G+3)
- Usage: PMAY(U) Beneficiaries
- Technology: Expanded Polystyrene Core Panel System with Sprayed Concrete Structural Plaster for wall/slab/roof

PROJECT PROFILE

- No. of houses : 40 Nos. (G+3)
- Usage: Working women hostel - rental basis
- Technology: Light Gauge Steel Frame (LGSF) System with Cement Fibre board on both side of walls and infill of rock wool

DHPs under PMAY(U) : 228 demonstration houses under construction



SALIENT FEATURES

- The system is dry walling system, brings speed in construction, water conservation (no use of water for curing of walling components at site).
- The sandwich panels have light weight material as core material, which brings resource efficiency, better thermal insulation, acoustics & energy efficiency
- Being light in weight results in lower dead load of building & foundation size
- Higher stories can be constructed using structural frames
- Being factory produced, ensure consistent quality
- Easy to install and customize
- Water, termite and fire resistant
- Manufactured without environmental damage

ECONOMIC ASPECTS

- Being factory-produced component, the cost competitiveness depends on economy of scale.
- Considerable structural cost savings due to low dead weight.

SUSTAINABILITY ASPECTS

- The panels use fly ash, an industrial waste, from thermal power station.
- Low density with lesser amount of materials consumed
- Lower foundation size in buildings
- Bring high thermal efficiency in buildings.





SUITABILITY & AVAILABILITY

- Suitable for all climatic conditions.
- Pan India distributors/ dealers' network.
- The only company providing 11ft long panels. Suitable for jumbo partitions in industrial spaces

LIMITATIONS, IF ANY

- The joints of panels with each other need to be perfectly locked by materials (cement, glue, dowel bars, polymer modified mortar etc.) & mechanism (leveling of panels etc.) prescribed by Panel manufacturer
- Cutting/chiseling of panels for openings such as doors, windows, service conduits etc. requires little training & through tools/machines prescribed by Panel manufacturer
- The panels if used as floors/ roofs, shall require screeding concrete of minimum 35 mm thickness with nominal reinforcement/ GI wire mesh for monolithic action to avoid leakage through panel joints
- Multi stories houses/buildings require structural framing system with Steel section/RCC Column, beams etc.

MARKET LINKAGES

- As distributors/ dealers' network is available Pan-India, the product can be supplied anywhere in the country.





MAJOR PROJECTS

- Across the country Individual Houses, Farm Houses, School building, Site office, Labor Accommodation.
- Projects for NCC limited, Infosys, ICICI Lombard, Lodha at various locations

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Certified by CBRI Roorkee & JNTUH College of Engineering, Hyderabad
- Evaluated as per testing methods of ASTM, BS & BIS.



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

BAMBOO REINFORCED CONCRETE HOUSING

Alternate to Steel reinforcement in Reinforced concrete construction



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

This technology replaces steel rebar with bamboo reinforcement in concrete structures, providing a cheaper, cleaner and sustainable alternative to steel reinforced concrete structures, while providing a comparable degree of disaster-resiliency and durability. The high tensile strength of Bamboo is utilized in conjunction with concrete for structural stability. The suitable adhesives are used to improve bonding between bamboo and concrete.

As regards the technology, the extensive experimentations have been carried out at the structural engineering laboratory at IIT Kharagpur over the past fifteen years. The results have been published in international journals and are highly cited. The technology has potential to save steel to a large extent in housing construction.



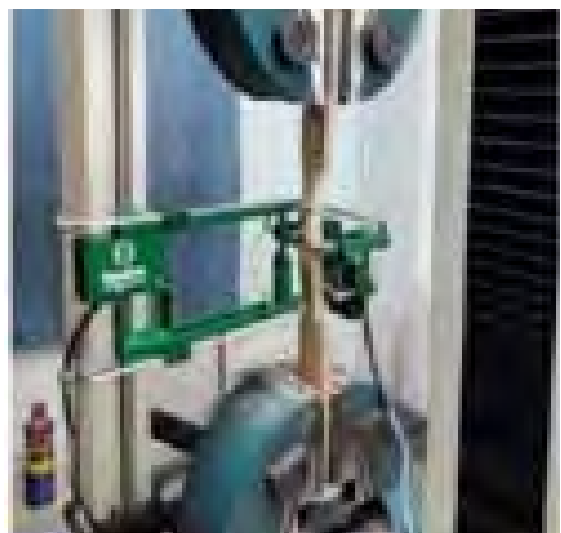
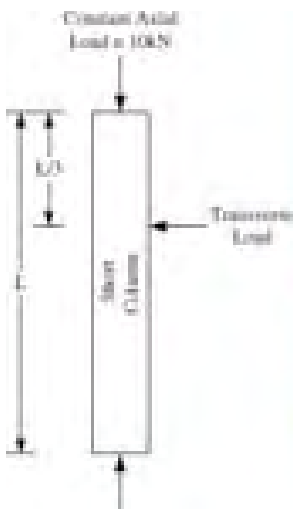


SALIENT FEATURES

- Bamboo is environment-friendly as it is natural, recyclable & locally available.
- Quality & durability of bamboo reinforced concrete is similar to steel reinforced concrete structures, once bamboo is properly treated chemically to prevent infestation and rotting
- In terms of energy efficiency, it is superior to reinforced concrete structure since steel production is replaced by the use of natural and fast growing plant bamboo
- Houses constructed using this technology have performed satisfactorily for more than seven years, after being exposed to several natural calamities like cyclones and floods
- The developed technology can be implemented in rural areas with the help of local people which is cost effective & easy to implement.
- Local labor can easily be trained to treat bamboo, cast bamboo reinforced concrete elements and build single-family houses.

ECONOMIC ASPECTS

- As bamboo is naturally fast growing plant & available abundantly, bamboo reinforced houses works out to be 25% cheaper than reinforced concrete structures with steel rebars.





SUSTAINABILITY ASPECTS

- The bamboo is widely available and can be cultivated as per the requirement, the developed technology would be quite sustainable.
- Use of this technology will create a great demand for bamboo which could lead to widespread and planned bamboo cultivation.

SUITABILITY & AVAILABILITY

- Technology is suitable for single and double storied houses for any climatic conditions, however local bamboo can be grown in tropical climate. Otherwise, bamboo may be cultivated nearby and transported to site.
- Both concrete and bamboo are widely available. If bamboo is naturally dried and treated, then additional treatment/technology is not required. However, mechanized cutting and preparation of bamboo speeds up the process significantly & such machines are already manufactured by existing industries across the country.
- Precast wall panels would increase the efficiency of construction and result in greater quality control, however, further research is required on the prefabricated connection ductility and strength.





LIMITATIONS, IF ANY

1. Public perception: People are reluctant to use bamboo for their own houses as it is not considered as par with conventional RCC houses, even though the technology has been demonstrated to be at par with conventional reinforced concrete/brick masonry structures.
2. The durability under earthquakes requires further research, though it is certainly superior to unreinforced masonry or mud housing.

MARKET LINKAGES

The research study & technical know-how is available with IIT Kharagpur.

DETAILS OF PROJECTS

Two houses, 1BHK and 2BHK, with area 275 sqft and 390 sqft respectively, have been constructed at the school premises of Jagriti Vidya Mandir near IIT Kharagpur. These houses are being used for office purpose in the school presently.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Structural designs as per IS 456 (Plain and reinforced concrete), Mix design as per IS 10262 (concrete mix proportioning), bamboo testing as per IS 6874.
- Extensive Research & experimentations at Structural Engineering Laboratory at IIT Kharagpur



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

CONTAINER HOUSING

An affordable alternative for EWS & LIG housing



Scan QR Code for
Video

CONTACT DETAILS

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Tel: +91-9434005801; +91-9830469410



BRIEF

Abandoned Railway and Shipping Containers of sizes 20' (L) X 8' (B) x 8'6"(H) are repurposed to be used as housing. The available container sizes are suitable for modular construction of EWS and LIG housing units of 30 sqm. and 60 sqm. of carpet areas respectively.

The technology is suitable for individual /scattered & low to medium height (G+3) houses. The container architecture is increasingly accepted with a great variety of applications, from simple emergency temporary housing to multi-functional, complex layout of various building types. In addition to affordable housing solutions, the technology also has scope for application for high end housing & various other building spaces with suitable internal and external treatment.



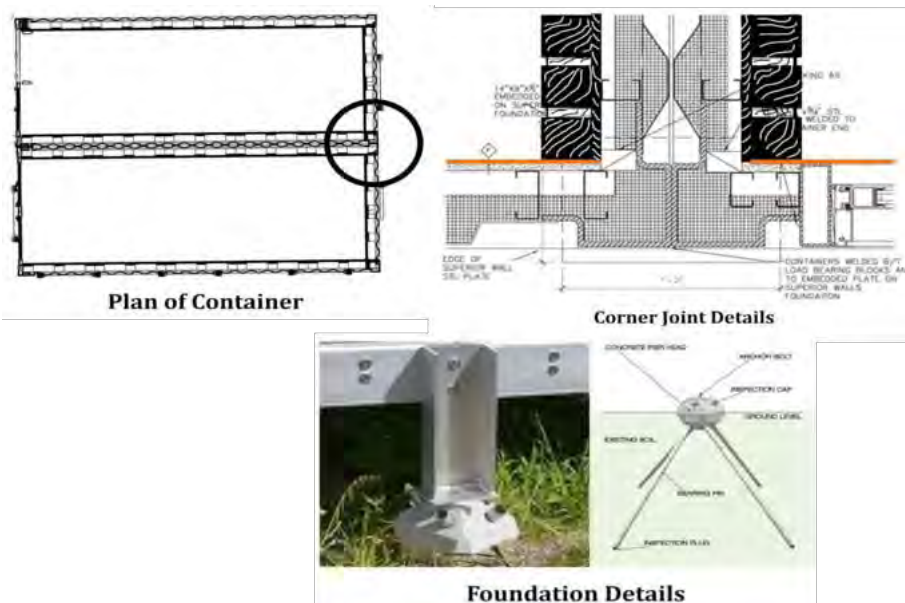


SALIENT FEATURES

- Upcycling and repurposing of abandoned container is eco-friendly option.
- Containers are strong and durable, will enable housing units to support high live & dead loads. Other qualities include earthquake resistance, less maintenance requirement, and termite resistance.
- The housing units can be dismantled and reused at a different site.
- This is a modular construction system with minimum requirement for cutting and welding. It is easy to assemble and no skilled workmanship required.
- High construction speed, it requires 3 weeks time for making ready a container home.

ECONOMIC ASPECTS

- The technology will ensure approximately 30 - 40 % reduction in cost over conventional construction of similar categories. Construction cost per unit is independent of economy of scale which does not depend upon the volume of work/number of units constructed.
- Reuse of containers for buildings results into a significant decrease in embodied energy.





SUSTAINABILITY ASPECTS

- There is a win-win situation since the containers are put to re-use beyond the 'active service age' with a new lease of life. The housing units can be dismantled and reused in a different site. Global warming potential (GWP) impact of the container house is at about 14.2 kg CO₂ eq./m²/year, over the whole life cycle, which is lesser than for timber and concrete houses at 22.3 and 38 CO₂ eq./m²/year, respectively.
- Huge expenses are otherwise involved in destructing or transporting back the containers. Also, containers are disposed to some landfill site, wherein huge space is occupied since the material is non-degradable.

SUITABILITY & AVAILABILITY

- Applicable to all climate conditions. However, proper treatment for thermal insulation is essential for enhancing indoor livability.
- Though containers are more readily available in locations close to railway and shipping yards, however used containers can be purchased online for any site across the country.



Photo source: World Wide Web



LIMITATIONS, IF ANY

- Sensitization and confidence building measures are required for social acceptability.
- There is a lack of standards for connection methods between containers and container to foundation which needs to be developed individually according to each project.
- The technology is resistant to earthquake, cyclone, flood and flash flood. However, field validation is required.

MARKET LINKAGES

The proposal is at academic research stage at IIT Kharagpur.

DETAILS OF PROJECTS

- No projects at this stage, further research is required.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Proposal is in embryonic stage, with academic research work at IIT, Kharagpur in 2012 and 2019. It requires further study, evaluation & Certification.



Photo source: World Wide Web

CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

RAPICON PANELS

Alternate to conventional masonry walling system.



Scan QR Code for
Video

CONTACT DETAILS

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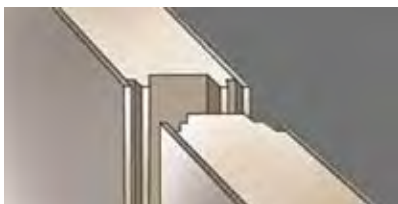
everest

BRIEF

Everest RAPICON Panel is a sandwich module having two non-asbestos facing sheets (4mm/5mm) of Everest Wall boards (as per IS 14862 Type B Category III), placed on either side of a lightweight concrete core. The lightweight core consists of a mix of Portland cement, binders, siliceous and micaceous material aggregates which are suitably aerated.

Wall Panels come with the tongue-and-groove joint system to facilitate easy assembly. The Wall Panel can easily replace brick and mortar; and other partition materials and systems for clean, hassle-free constructions.

The Panels are used in a wide range of applications such as, wall partitions, claddings, ceilings, external walls, facades, interior and exterior wall linings, pre-fab structures, etc.

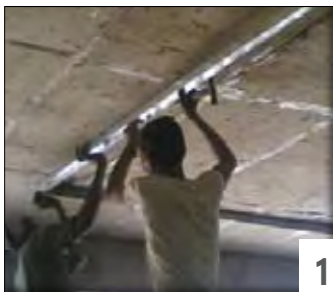


SALIENT FEATURES

- The system is dry walling system, brings speed in construction, water conservation (no use of water for curing of walling components at site).
- The sandwich panels have light weight material as core material, which brings resource efficiency, better thermal insulation, acoustics & energy efficiency
- Being light in weight results in lower dead load of building & foundation size
- Higher stories can be constructed using structural frames
- Being factory produced, ensure consistent quality
- Can be relocated easily
- Less wastages during construction
- Panels are very light in weight. The weight of one module of size 3000mm x 600mm x 50mm is approx. 70 kgs which can be handled manually.
- With high quality boards as skin, Rapicon Wall panels have a smooth finish and are dimensionally stable with resistance to moisture/humidity.

ECONOMIC ASPECTS

Being factory-produced component, the cost competitiveness depends on economy of scale. However, dry walling system with lesser manpower requirement & reduced project duration help in overall reduction of project cost.



1



2



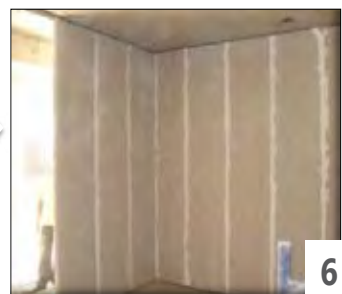
3



4



5



6



7



8

SUSTAINABILITY ASPECTS

- The panels use fly ash, an industrial waste from thermal power plants
- Panels have low density with lesser amount of materials consumed
- Lower foundation size in buildings
- Thermal insulation is better as the U Value of Rapicon wall system is 1.85 W/m²K as compared to 6.03 W/m²K of 9" plastered brick wall.
- Fire rating of Rapicon wall system is 134 Mins
- Cooler interiors as against brick work.

SUITABILITY & AVAILABILITY

- Suited for all weather conditions.
- Can be transported across the country and other finishing materials are also readily available at all places.
- The Panels come in three sizes, i.e., 2.4 mtr, 2.7 mtr & 3.0 mtr in length, and 0.6 mtr width and two available thickness: 50 mm & 75 mm.
- Everest Rapicon Panels are designed for interior wall applications and also partitions wherever there is no direct exposure to outside weathering conditions. However, the exposed surface will have to be coated with exterior paints.



LIMITATIONS, IF ANY

- The joints of panels with each other need to be perfectly locked by materials (cement, glue, dowel bars, polymer modified mortar etc.) & mechanism (leveling of panels etc.) prescribed by Panel manufacturer.
- Cutting/chiseling of panels for openings such as doors, windows, service conduits etc. requires little training & through tools/machines prescribed by Panel manufacturer.
- The panels if used as floors/ roofs, shall require screeding concrete of minimum 35 mm thickness with nominal reinforcement/ GI wire mesh for monolithic action to avoid leakage through panel joints.

MARKET LINKAGES

- The product can be supplied Pan India.

MAJOR PROJECTS

- Government Sr. Secondary School, PWD, Delhi,
- D. Y. Patil Dental College, Navi Mumbai, Mumbai
- Silver Oak College of Engineering & Technology, Ahmedabad
- Ansal Institute of Technology, Lucknow
- Baby Memorial Nursing College, Calicut
- Vibgyor High School, Goregaon (E), Mumbai



CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Panel included in CPWD DSR 2021.



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

LIGHT WEIGHT CELLULAR (LWC) PANELS

Alternate to conventional walling system.



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Light Weight Cellular (LWC) panels consist of fly ash (580 kg), cement (140 kg), water (80 kg) per cubic meter, along with foaming agent. It has protruded trough shaped, 20 mm deep and 72 mm wide notch, which forms a male-female type joint connection at the top and bottom edge of panel, with an intent to achieve vertical interlocking between the upper and lower panels, thus improving the integral action between the panels. LWC panels measures 590 x 270 x 140 mm, having four vertical holes of 60 mm diameter, spaced at 157 mm c/c (Fig. 1). Two holes may be casted with rebar and concrete if implemented in high seismic regions.

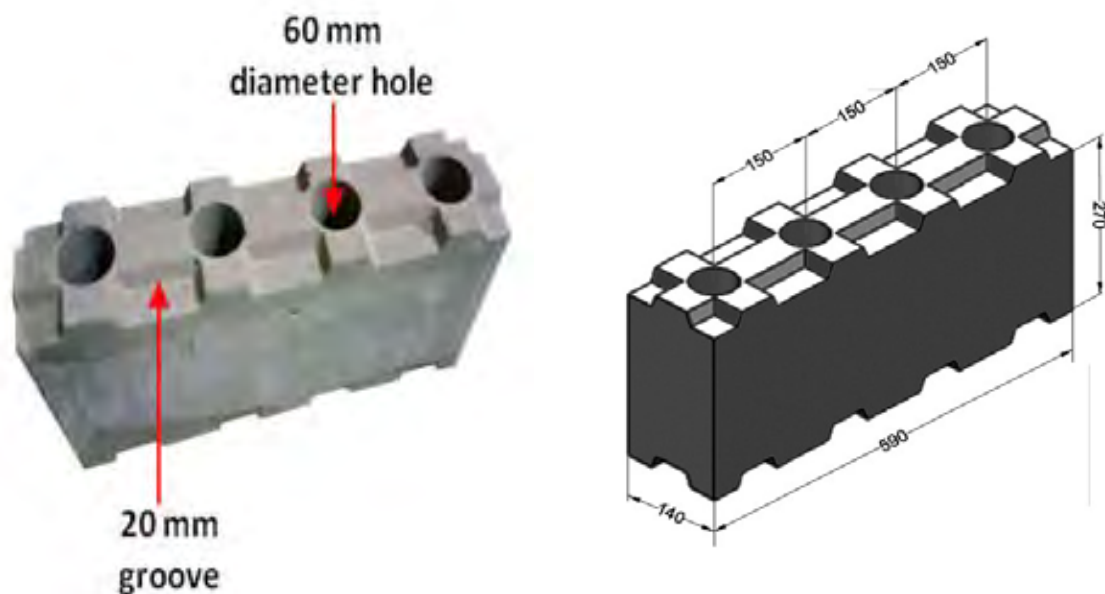


Fig. 1. LWC panel



SALIENT FEATURES

- Light weight, thus easy handling.
- Provide benefit of extra floor space due to reduced thickness.
- Easy and eco-friendly manufacturing process as compared to burnt solid clay units.
- Minimal constructions skills requirement
- Facilitate interlocking mechanism with vertical panels, thus minimal damage and prevents panel-to-panel separation at the interface.
- Facilitate rapid construction and easy to construct methodology without using heavy equipments.
- Utilize waste material (fly ash) as major ingredient
- Satisfactory performance in axial and lateral loads (earthquake, wind force etc.)
- Aesthetically compliant to social and cultural environment.
- Suitable & economically viable for low-to-medium rise construction

ECONOMIC ASPECTS

- Large quantity of fly ash as raw material, light in weight & fast construction with these panels, makes it economically viable for low-to-medium rise construction with about 30% cost reduction.





SUSTAINABILITY ASPECTS

- Prevalent burnt solid clay units utilizes natural resources such as clay/soil and coal. Moreover, their manufacturing process involves consumption of coal and requires firing thus creating environmental pollution. Alternatively, LWC panels are manufactured using waste material such as fly ash as one of the component thus eliminating the need of soil or clay. Further to this, they have eco-friendly manufacturing process, which do not require firing and reduces the depletion of natural resources, thus imparting overall sustainability in construction.

SUITABILITY & AVAILABILITY

- Suitable for all types of climatic conditions.
- Can be used in load bearing walls in masonry buildings, as well as in infill walls in RC frame buildings.

LIMITATIONS, IF ANY

- Suitability for individual /scattered and low to medium height (G+3) houses and not in load bearing walls of high-rise buildings.
- Single storey and two storey confined masonry buildings with the proposed LWC panels are favourable for all the seismic zones, while three storey buildings can be adopted up to zone IV.





MARKET LINKAGES

- The research study & technical know-how is available with CBRI, Roorkee.

MAJOR PROJECTS

- Currently being implemented in various masonry load bearing and RC frame buildings in Uttarakhand and Uttar Pradesh.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Tested at CSIR-CBRI for various material and engineering properties; along with full-scale confined masonry building using LWC panels tested under lateral load.



Full-scale CM Building



Damage Pattern from Lateral Load Test

CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

ROUND BOULDERS MORTAR (RBM) UNITS

Alternate to burnt clay bricks for walling.



Scan QR Code for
Video

CONTACT DETAILS

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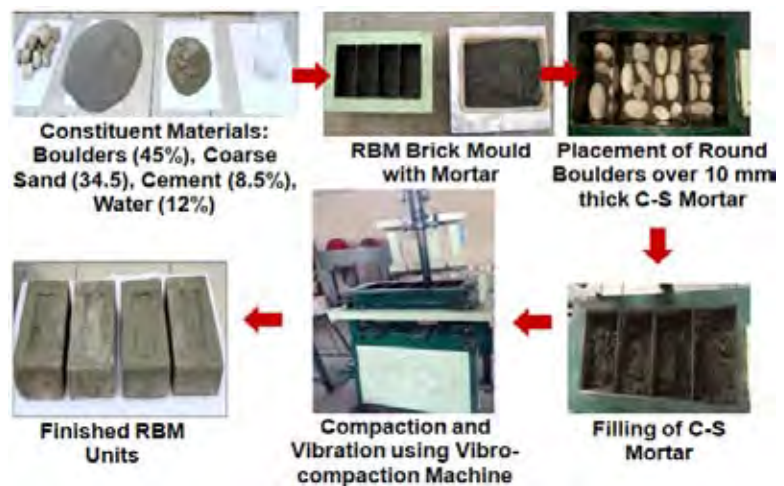
BRIEF

40-60 mm size round boulders (45% by volume), confined in cement and coarse sand mortar in the ratio of 1:6 (c:s) having cement content of 8.5% and coarse sand content of 34.5%, mixed thoroughly with water (12% by volume) to form a RBM unit. These units can be manufactured on mass-scale using C-brick machine which uses vibro-compaction technique for producing units.

The product is ideally suitable where round boulders are available locally.

SALIENT FEATURES

- Promotes use of locally available materials (round boulders) hence low transportation cost.
- Eco-friendly manufacturing process (no firing and clay consumption) & Energy efficient.
- Employment generation and no special skills required for manufacturing.
- Less breakage and better shape.
- Low carbon footprint.
- 40% cost reduction as compared to prevalent burnt solid clay units.
- Superior engineering properties as compared to prevalent burnt solid clay and AAC units (100% increase in compressive strength and 30% increase in shear strength).
- Manufacturing rate of 3000 units of size 230x110x80 mm in one shift of 8 hours using C-brick machine.



Manufacturing Process of RBM Units



ECONOMIC ASPECTS

- 40% cost reduction as compared to prevalent burnt solid clay units.

SUSTAINABILITY ASPECTS

- India consumes around 250 billion units annually, whose production is being done in rudimentary method with varying soil types across the country. Several million tonnes of coal and several million tonnes of biomass fuel is consumed annually for the manufacturing of burnt solid clay bricks, which results in environmental pollution and depletion of resources. Noteworthy, burnt solid clay brick sector is responsible for 9% of the total black carbon emissions in India. One clay brick consumes 3.2 kg of top soil. Moreover, one square feet of clay bricks exhaust 8 kg of coal and emit 17.6 kg of CO₂. On the other hand, one square feet of AAC block exhaust 0.9677 kg of coal and emit 2.2 kg of CO₂. The firing involved in the manufacturing process of burnt solid clay bricks results in environmental pollution. Although, other units, such as AAC units overcome certain issues, but there are issues with physical and engineering properties if proper quality control measures are not taken, which limits their adoption in the construction industry. Alternatively, RBM units are manufactured using locally available round boulders as filler material, which produces units at a relatively lower cost, have minimal environmental hazard and eco-friendly manufacturing process, thus imparting overall sustainability in construction.

SUITABILITY & AVAILABILITY

- Suitable for all types of climatic conditions.
- Widely applicable in hilly regions and where round boulders are available in abundance.
- Can be used in load bearing as well as infill walls in buildings or in retaining walls.
- Manufactured using CSIR-CBRI developed C-brick machine.

LIMITATIONS, IF ANY

- Suitable for hilly & other regions where round boulders are available locally

MARKET LINKAGES

- The research study & technical know-how is available with CBRI, Roorkee.

MAJOR PROJECTS

- Two-storey masonry building constructed using RBM units at Construction Technology Demo Park of CSIR-CBRI Roorkee.
- Currently being implemented in hilly regions of Uttarakhand and Himachal Pradesh.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Tested at CSIR-CBRI for various material and engineering properties.



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

RC PLANKS AND JOISTS SYSTEM

Alternate to conventional roofing system.



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Reinforced Concrete Planks of size 1900 x 800 x 60 mm are precast structural components for roof, which are supported on joists. The manufacturing process includes oiling of moulds, placement of reinforcement, casting of concrete in moulds and curing.

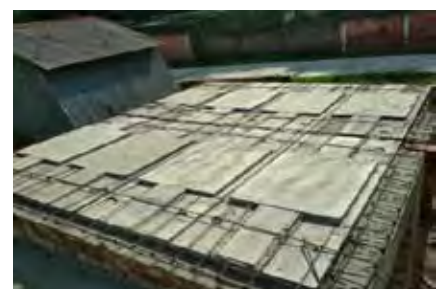
Once the planks & joists are placed, an in-situ concrete layer with nominal reinforcement is laid on the top of it & smooth finish of floor/roof is provided.

SALIENT FEATURES

- Completely precast component.
- No major machinery required for casting and production of components.
- No special skilled labour required.
- Time saving.
- No requirement of shuttering.
- Best suited for rural areas where shuttering is not easily available.
- Hooks provided at all 4 ends for lifting arrangement.
- Overall 40% economical than conventional roofing system without any compromise on strength and safety.

ECONOMIC ASPECTS

- Economically viable for low-to-medium rise construction and 40% economical as compared to conventional roofing system.





SUSTAINABILITY ASPECTS

- Requires less volume of cement, sand, aggregates and steel with higher level of strength and safety; thus imparting a more sustainable roofing system.

SUITABILITY & AVAILABILITY

- Suitable for all types of climatic conditions.
- Can be manufactured using easily available building materials.
- Widely applicable in rural areas where shuttering is not easily available.
- Can be used in masonry as well as RC frame buildings.



LIMITATIONS, IF ANY

- As a set up with Moulds, machineries etc. are required for producing pre-cast components, a minimum number of houses (specific to project location) are required for making the construction economically viable.



MARKET LINKAGES

- Using specific moulds/ machineris, the components can be manufactured at any place using available building materials. The technology/ know-how is available at CBRI-Rooke.

MAJOR PROJECTS

- Widely implemented in rural regions.
- Delhi State Industrial Development Corporation (DSIIDC) Housing Projects

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Tested at CSIR-CBRI for load evaluation.



CATEGORY

BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

HEADED BARS AS MECHANICAL ANCHORAGE SYSTEM FOR REINFORCED CONCRETE BEAM-COLUMN JOINTS

Alternate System for Steel development length.



Scan QR Code for
Video

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BRIEF

Headed bars consists of steel anchor (head) attached to the end of beam rebar through welding or threading and embedded in concrete. Unlike the plain head anchors, herein the deformed head anchors are used, which consists of deformations (grooves and ribs) over the anchor surface for better interlocking and gripping with the surrounding concrete. These ribs are circular projections protruded outwards with a protrusion of 2 mm from the head surface. Plain headed anchors have the tendency of slipping and movement in the concrete, whereas deformed headed bars are expected to experience low slippage. These headed bars are placed parallelly in the reinforced concrete (RC) beam-column joint region such that they are not in contact of each other.

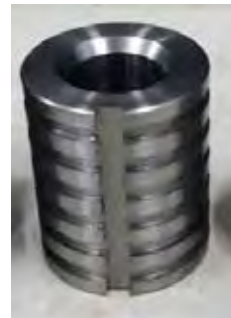
The advantages of headed bar over development length relate to reduction in steel congestion, saving in construction costs, better concrete consolidation, adequate anchorage, better bond strength and speed in construction.



Head anchor for 32
mm dia rebar



Head anchor for 25
mm dia rebar



Head anchor for 20
mm dia rebar



Head anchor for 16
mm dia rebar

SALIENT FEATURES

- Easy workmanship and concreting
- Cost-effective as compared to conventional development length
- Rapid construction
- Efficient mechanical anchorage system, leading to excellent strength of beam-column joints

ECONOMIC ASPECTS

The technology will ensure cost reduction over conventional construction based on diameter of beam rebar as illustrated in Table 1.

Table 1. Cost Analysis of Headed Bars

| Rebar Dia (mm) | Anchor Dia (mm) | Anchor Length (mm) | Anchor Cost* (₹) | Total Costing of Anchor# (₹) | Costing of Development Length% (₹) |
|----------------|-----------------|--------------------|------------------|------------------------------|------------------------------------|
| 12 | 24 | 27 | 20.50 | 36.50 | 38.40 |
| 16 | 32 | 36 | 32.50 | 64.36 | 91.02 |
| 20 | 40 | 45 | 53.00 | 104.11 | 177.78 |
| 25 | 50 | 56 | 90.50 | 172.91 | 347.22 |
| 32 | 64 | 72 | 174.50 | 315.58 | 728.18 |

*Cost as per manufacturer

#Anchor cost + rebar cost, considering rate of ₹60/kg including labour charges. (Rebar length embedded in beam considered as 300 mm)

%Development length as per IS-13920:2016, considering rate of ₹60/kg including labour charges



SUSTAINABILITY ASPECTS

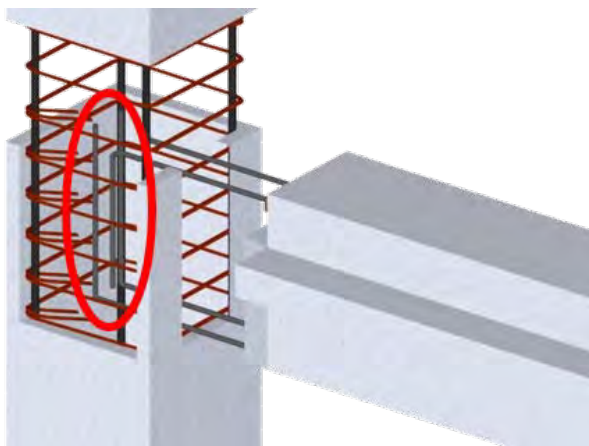
- Headed bars require less steel as compared to conventional system of mechanical anchorage in RC beam-column joints, thus bestowing a more sustainable system.

SUITABILITY & AVAILABILITY

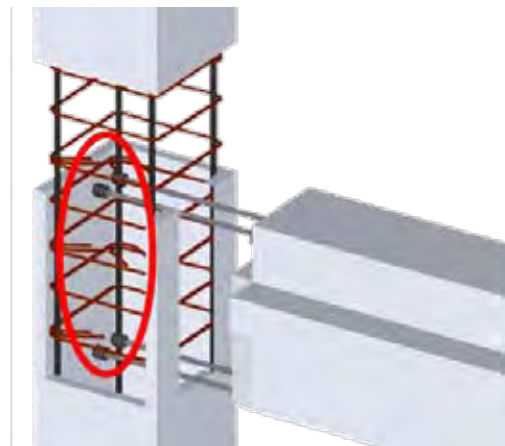
- Suitable for all climatic conditions
- Suitable for individual /scattered and low to medium height (G+3) houses, as well as high-rise buildings.
- Can be manufactured using lath machine by any steel fabricator.

LIMITATIONS, IF ANY

- Suitable for RC beam-column joints with rebar diameter ≥ 12 mm.
- Grooves and ribs may be provided on head surface for better bond.
- Best performance when ratio of head length and diameter is 1.
- Condition: Head diameter ≥ 2.25 (rebar diameter); and head area ≥ 5 (rebar area).



Conventional Development Length



Headed Bars



Plain Headed Bars



Grooved Headed Bars



Ribbed Headed Bars

MARKET LINKAGES

- The technology/ know-how is available at CBRI-Roorkee.

MAJOR PROJECTS

- Currently being implemented in building construction at National Institute of Technology Goa.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- In the process to be included in the revised version of IS 13920.



Headed Bar Embedded in Concrete Cube



Pull-out Test Set-up



Experimental Set-up



Cyclic Load Test Set-up

CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

COST-EFFECTIVE CONSTRUCTION TECHNOLOGIES USING STABILIZED MUD BLOCKS, RAT-TRAP BOND, FILLER SLAB & BAMBOO PRODUCTS

Various Alternatives to conventional walling & roofing system



Scan QR Code for
Video

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BRIEF

Established in 1987 in Kerala, Habitat Technology Group is one of the largest Non Government Organizations (NGOs) in the building sector operating in the Country, which is committed to the concept of green and humane architecture. It has been recognized as a nodal agency to carry out developmental works under the decentralization process in Kerala. The main activity of Habitat group includes Customized Shelter Solutions suiting to the client's requirements and budget, and Community Living employing environment-friendly sustainable technologies to create townships and community living centers. The technologies primarily employed are;

- Mud Architecture (COB, Rammed Earth, Wattle and Daub, Adobe, Stabilized mud blocks), primarily using soil stabilized with binder, wood, straw etc.
- Rat-Trap Bond (Creating a cavity (hollow space) within the wall)
- Filler Slab (Replacing the concrete in the bottom half of slab with cheaper locally available filler material)
- Bamboo based components (Joinery, Walls, Column, Roof) : Bamboo is a very fast growing natural building material with very good engineering properties



Other important activities include;

- Responding Centers: Have responding centers at most places in Kerala, few outside and selected places abroad.
- Disaster Interventions: Habitat's effort to help & reorganize the people & families affected by disasters.
- School Of Housing & Training: Capacity building for workers and professionals in the shelter sector using extensive training programs
- Research And Development: Research and development in appropriate technologies and materials
- Information & Dissemination: Information dissemination on cost effective shelter solutions.

SALIENT FEATURES

- One of the largest NGO's in building sector in India
- Have 32 responding centers spread in 10 states.
- More than 300 professional architects & engineers.
- 30,000 trained habitat workers.
- Pioneers in promoting sustainable & ecofriendly building technologies in India,
- The technologies employed have lower embodied & operational energy, lower emissions, reduce the requirement of energy intensive materials as cement & steel, & brings economy through resource efficiency & use of local materials
- Have designed and built more than 20,000 buildings including residences, theaters, commercial complexes, institutional campuses etc.
- First township using cost-effective technologies at Sirumugai near Coimbatore

ECONOMIC ASPECTS

- The products/ technologies are based on local & natural materials (fast growing bamboo) which are cheaper & reduce the consumption of cement & steel, thereby reducing the cost of construction
- Machineries/ techniques used are generally simple, therefore any person can be trained with little efforts for the construction job, thus providing local employment.



SUSTAINABILITY ASPECT

- Replacement of cement & steel with locally available resources reduces the energy consumption.
- Avoids the use of burnt clay bricks, thus reduces the Green House gas emissions due to burning of fossil fuels & preserving the top fertile soil for agricultural purpose

SUITABILITY AND AVAILABILITY

- The products/ technologies are environment friendly & suitable for all climatic conditions. Services available primarily in Kerala and selected places in India and abroad.

LIMITATIONS (IF ANY)

- Mostly available in Kerala.

MARKET LINKAGES

- Services available in Kerala and selected places in India and abroad.



MAJOR PROJECTS

- Science City, Kottayam ,Kerala
- K R Narayan National Institute of Visual Science and Arts, Kottayam, Govt. of Kerala
- Kerala State Literary Mission Head Office, Petta, Trivandrum.
- Mahan Tribal Rehabilitation Singrauli, Madhya Pradesh
- Headquarters for CCDB, Bangladesh, The largest mud building in Asia
- Disaster Relief Project Puthumala, Kerala
- Haristhali, Sector 32, Naya Raipur, Chhattisgarh
- Siddhartha, Thruivananthapuram, Kerala
- Bamboo School and Hostel, Trivandrum.
- Director General's home at NIRD, Hyderabad.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- National Award for slum rehabilitation works instituted by the Ministry of Poverty Alleviation Govt. of India, SLUM REHABILITATION VELI – KERALA - 2001
- First Laurie Baker Award constituted by Govt. of Kerala for outstanding contribution to low cost housing technologies- 2008
- Padma Shri , Government of India in 2011
- National Award for best Eco – city Design by Govt. of India
- National award for green building SIDDHARTHA, DG Residence for NIRD- 2017-18
- National award for disaster resilient housing ASTER HOMES, KERALA – 2019
- National award for Cost Effective Urban Housing DGP's Residence- Kerala – 2020
- National award for green building BODHI, KERALA - 2020



CATEGORY BUILDING SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

AEROCON PANELS WITH STEEL STRUCTURAL SYSTEM

*Alternative to conventional RCC framed structural system with
bricks/blocks as infill walling material*



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

The agency is service provider for design, manufacturing & construction of Prefabricated buildings. For building construction, it primarily uses prefabricated Aerocon panels along with steel structural frame. Aerocon Panels are produced by Hyderabad Industries Ltd. (HIL, Birla Group), which are cement sandwich panels made of two fibre reinforced cement facing sheets, on either sides of a light-weight concrete core. These panels have a unique tongue and groove jointing system that facilitates rapid construction and are fully cured at the factory itself.

The Agency is also engaged in steel fabrication works, steel industrial sheds, false ceiling works, roofing solutions etc. Prefabulous Homez LLP is a Limited Liability Partnership firm incorporated on 03 March 2021.





SALIENT FEATURES

- Aerocon panels have Superior thermal & acoustical insulation.
- Good fire resistance
- Multipurpose application.
- Faster Construction.
- Water, Termite & mould Resistant.
- Cost effective
- Steel sections used as structural components, increases the speed of construction & durability of the structure

ECONOMIC ASPECTS

- Easily to erect and less time of construction.
- Less manpower requirement.
- Lower maintenance requirement
- Provides higher carpet area about 3-5%
- 5 times faster than Brickwork, thereby saving time & cost.





SUSTAINABILITY ASPECT

- Aerocon panels are Reusable up to 80%.
- The product is green as core contains materials such as pulverized fly ash and light weight aggregate which make it light weight & environment friendly.
- Energy efficient with lower 'U' value.
- Steel used can be recycled multiple times

SUITABILITY AND AVAILABILITY

- Aerocon panels are suitable for all climatic conditions
- Easily available via orders across country.

LIMITATIONS (IF ANY)

- Suitable for single storey load bearing structure, and as infill wall in Multi-storied buildings.





MARKET LINKAGES

- Pan India Availability.

MAJOR PROJECTS

- Various projects in and around Hyderabad.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Aerocon panels are cerified under PACS of BMTPC





**GLOBAL
HOUSING
TECHNOLOGY
CHALLENGE** INDIA

Indian Housing Technology Mela (IHTM)

**B. Products/Technologies Primarily
from Recycling of Industrial/Agricultural
Wastes, Waste Management Systems**



“अगर हम पीएम आवास योजना के तहत बनाए गए लाखों घरों के काम पर नज़र डालें तो, उसमें इनोवैशन और इम्प्लेमेंटेशन, दोनों पर फोकस मिलेगा। बिल्डिंग मटेरियल्स में स्थानीय ज़रूरतों और घर के मालिक की अपेक्षाओं के अनुसार इनोवैशन नजर आएगा...”

– नरेन्द्र मोदी

CATEGORY BUILDING PRODUCTS FROM RECYCLING OF WASTES



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

AGROCRETE® SOLID & HOLLOW CONCRETE BLOCKS AND BINDR™

*Agrocrete is alternate to burnt clay bricks/blocks and Bindr
is alternate to cement for mortar.*



Scan QR Code for
Video

CONTACT DETAILS

M/s GreenJams

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Contact No. 9591170791



BRIEF

Agrocrete® bricks/blocks are made from crop residues like paddy straw, cotton stalk, bagasse, etc. and industrial by-products like slags, ashes & lime sludge. The solid load bearing blocks are alternate to burnt clay bricks and suitable upto G+1 load bearing structures whereas hollow non-load bearing blocks are alternate to AAC / hollow clay blocks and suitable to low to high rise buildings.

Agrocrete blocks are manufactured following the steps (a) collection of crop residue from farmers as raw material, (b) mixing the raw material with binder, (c) moulding the blocks and compressing them through hydraulic press and (d) storage and supply. The binder used for agrocrete blocks is not cement but made from industrial by-product of steel, paper & power plants.

The another product of M/s Green Jam is a binder with trade name BINDR™. It is a low carbon replacement of Portland Cement for mortar and plastering. It is manufactured using slags, sludges (EAF slag, AOD slag, lime sludges, etc.) from various steel and ferro alloy.

Both the products are being patented and are based on low energy, low resource and advanced alkali activation chemical technology.



SALIENT FEATURES

AGROCRETE®

- The solid load bearing blocks comes in sizes 400x150x100mm; 300x200x100 mm. However, it can be customised as per requirement.
- The compressive strength of solid blocks is more than 10 MPa as compared to 7.5 MPa of flyash bricks
- The density is 1400 kg/m³ as against density of flyash bricks which is 1800 kg/m³.
- The water absorption is 10-12% as against 18% of flyash bricks.
- The hollow non-load bearing blocks comes in sizes 400x150x225mm, 400x150x150mm, 400x150x125mm, 400x150x100mm. However, it can be customised as per requirement.
- The compressive strength of hollow blocks is more than 5 MPa as compared to 3-4 MPa of AAC blocks
- The density is 800-1000 kg/m³ as against density of AAC blocks which is 650 kg/m³.
- The water absorption is 10-15% as against 15% of AAC blocks.
- These are carbon-negative building material – reverses climate change
- Stronger than conventional fly ash bricks, burnt clay bricks,
- Lighter and have good thermal Insulation and Fire resistance.
- Improves energy efficiency of the building due to higher thermal insulation
- Highly suitable for low-rise as well as high-rise constructions. Agrocrete® Solid Blocks are load bearing and enable structural-frame less construction
- Agrocrete® Hollow Blocks are strong, lightweight and suitable for high-rise constructions.



BINDR™

- Low-carbon, zero-clinker alternative to Portland Cement for mortar and plastering
- Compressive Strength : ≥ 43 MPa
- Initial Setting Time : 100 min
- Final Setting Time : 250 min
- Rapid strength gain and lesser water required for curing.
- Excellent bonding



ECONOMIC ASPECTS

- The blocks can be manufactured in customizable size and is carbon negative material
- Solid blocks offer 50% lower construction cost, 50% higher thermal insulation, 30% lesser weight, 60% faster masonry, 60% lesser mortar required, and 20% lesser plaster requirements
- Hollow blocks offer 40% lower construction cost, 40% higher thermal insulation, 20% thinner walls giving more carpet area for the same built up area.
- The BINDR™ is complete cement free building material and can be used for masonry mortar and plastering. It requires less water and offer early strength and excellent bonding.

SUSTAINABILITY ASPECTS

- Carbon negative materials
- 100% upcycled products
- The products are made 100% from by-products namely (1) crop residues such as rice straw, paddy straw, sugarcane bagasse, etc., (2) Any fuel ash – fly ash, boiler ash, etc. (3) slags & sludges – EAF slag, AOD slag, lime sludges, etc.
- 100% make in India product using no imported/foreign machinery
- The thermal conductivity of solid blocks is 0.4 W/m.K as compared to 0.8 W/m.K of flyash bricks
- The embodied carbon of solid blocks is -0.15 kg CO₂/kg as compared to 0.24 kgCO₂/kg of flyash bricks
- The durability of solid blocks is 75+ years.
- The U-Value of hollow blocks is 1.3-1.6 W/m².K as against 2 W/m².K of AAC blocks.
- The embodied carbon of hollow blocks is -0.15 kg CO₂/kg as compared to 0.24 kg CO₂/kg of AAC blocks
- The durability of hollow blocks is 75+ years as compared to <50 of AAC blocks
- The BINDRtm has embodied carbon 0.10 kg.CO₂/kg offering 80% lesser CO₂ emissions.

SUITABILITY AND AVAILABILITY

- Suitable for all climatic conditions.
- Available in customizable sizes.
- Safe against all natural hazards.
- Current manufacturing facility producing 600 blocks per day is in Roorkee, Uttarakhand.





LIMITATIONS, IF ANY

- At present, M/s Green Jams has only one manufacturing plant i.e. in Roorkee, Uttarakhand. The cost viability need to be worked out for far flung areas.

MARKET LINKAGES

- The manufacturing plants can be set up in different parts of India.
- The blocks can be supplied Pan India.

MAJOR PROJECTS

- Ajmera Greenfinity, Wadala, Mumbai,
- 1,100 sq. ft. Agrocure® load bearing structure at Roorkee, Uttarakhand. Reduced cost of construction by 30%, and man-hours & mortar joints by 60%. Carbon Captured: 3.1 tons of CO₂.
- 1,500 Agrocure® blocks used for a leisure home at private farm in Surajgarh, Rajasthan. Carbon Captured: 2.36 tons of CO₂.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Agrocure® solid blocks tested and certified by CSIR-CBRI, Roorkee according to IS 2185 Part 2.



CATEGORY BUILDING PRODUCTS FROM RECYCLING OF WASTES



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

BIO-BRICKS FROM AGRICULTURAL WASTE

Alternate to burnt clay bricks/blocks.



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Researchers from IIT, Hyderabad and KIIT, Bhubaneswar in collaboration with Swinburne University of Technology, Australia, have developed bio-bricks - a sustainable building material from agricultural waste as an alternate to burnt clay bricks. The product serves the dual purpose of waste management and development of eco-friendly, sustainable buildings. The process of making bio-bricks starts with careful selection of dry agro-waste such as paddy straw, wheat straw, sugarcane bagasse and cotton plant. The agro waste is first chopped to desired size and mixed with lime based slurry and water with the help of hand or mixer. The mixture is poured into moulds and thoroughly compacted with a wooden dowel to make compact bricks. The moulds are then left for 24 hours before the sides of the moulds were opened and left to dry for 15 to 20 days.

The chopped husk and lime slurry are mixed in 1:3 ratio by weight. To improve the strength and binding of the bio-brick traditional additives are added such as pulp of "Bel fruit", river clay slurry, and liquid molasses.



Bio-brick is prepared by mixing chopped husk, lime slurry in 1:3 ratio by weight.



SALIENT FEATURES

- More sustainable than clay bricks
- Suited for non-load bearing walls
- Density of Bio-Brick is 455.5 kg/m^3 as against density of fired clay brick: $2000 \sim 2400 \text{ kg/m}^3$ and concrete block: $1800 \sim 2100 \text{ kg/m}^3$
- Being lighter in weight, the overall weight of structure is reduced giving economical design
- Better seismic resistance being lighter in weight.
- Fire retardant.
- Serves as carbon sinks as they fix more CO_2 than they produce during their lifecycle.
- Good insulation to heat and sound and helps in maintaining humidity in a building.
- Recycling agro waste in this way reduces air pollution, which might have been caused if this waste was burnt instead.
- Eco friendly sustainable Building Materials.

ECONOMIC ASPECTS

- Owing to its low density, bio-bricks can effectively reduce the load on the column and beams structure, thereby reducing the amount of steel and concrete thereby reducing the overall cost of the building.
- Thin sections of bio-bricks can be used as insulation boards in existing buildings to reduce the heat gain from the surrounding, these can help in reducing the air conditioning load and can save lot of energy, making our building more greener and sustainable.
- The researchers have shown that cost reduction in walls for a typical EWS house of 25 sqm. will be around Rs. 70,950 per DU. The cost of bio-brick as claimed by IIT Hyderabad is Rs.3 as against Rs.8.50 for burnt clay bricks.



SUSTAINABILITY ASPECTS

- Most of the manufacturing process in India moves in a linear path of “resource-product-waste” leading to unsustainable development.
- The development of Bio-Bricks was based on the three fundamentals of Circular Economy, i.e., “reduce, reuse and recycle”.
- Bio-Bricks recycle and reduce the agro-wastes to create new building materials and at the End Of Life (EOL) it can be crushed and reused as raw materials for creating new bio-bricks thereby confirming to the three paradigms of Circular Economy.
- Bio-bricks can give additional income to farmers from the agro-wastes there by making the whole process economically viable. This will lead to reduction of stubble burning and air pollution.
- These bricks can substitute a part of burnt clay bricks there by reducing loss of topsoil.
- The demand for such bio-bricks will lead to development of new green and sustainable industries and create new jobs at grassroot levels.

SUITABILITY AND AVAILABILITY

- Suitable in all climate conditions.
- Use of local available agricultural waste material
- Can be used in low cost Housing with combination of wooden or metal structural framework.



LIMITATIONS, IF ANY

- At a research and development level.
- Not as strong as burnt clay bricks and cannot be used directly to build load bearing structures.

MARKET LINKAGES

- The technology is at a proof of concept stage and need to be upscaled and accelerated.

MAJOR PROJECTS

- In collaboration with IIT Hyderabad and funded by BUILD project IITH, a first of its kind prototype building i.e. a guard cabin based on Bio-bricks is constructed in IIT Hyderabad.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Indian Patent
- Special recognition at Rural Innovators Start-Up Conclave 2019 by National Institute of Rural Development and Panchayati Raj (NIRDPR)
- Research Papers at International Conference - ICED19 and ICoRD21.



CATEGORY WASTE MANAGEMENT SYSTEMS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

DIGITAL ECOSYSTEM ACROSS THE WASTE VALUE CHAIN (RECYKAL) / WASTE MANAGEMENT SYSTEM

Alternate to conventional practice of waste collection & disposal/processing



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Recykal's digital Waste Ecosystem includes an on-line marketplace connecting buyers and sellers of waste (plastic, paper, e-waste etc.). Here, Waste Generators (Businesses, Consumers), Waste Processors (Aggregators, Informal Sector) and Recyclers across the Country, are connected digitally. The system benefits not only all stakeholders in the waste management value chain, but support a sustainable waste management value chain for the benefit of society and the environment. It provides comprehensive solutions to the Brands via take back & exchange systems, collection centres, reward points, consumer awareness, recycling, and enables them to achieve their Extended Producer Responsibility (EPR) objectives.

Waste Exchange Online marketplace connecting buyers and sellers of waste



Municipal
Collection



Ragpickers,
Kabadiwalas

MRF DIGITIZATION SOLUTION



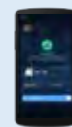
Solution to record all
transactions at
MRFs / DRCCs



MRFs / DRCCs

Digitized MRFs /
DRCCs are
connected to the
Waste Exchange

WASTE EXCHANGE



Waste Exchange
gives connectivity
to pan India
recyclers



RECYCLERS



CO-PROCESSORS



ROAD
CONSTRUCTION

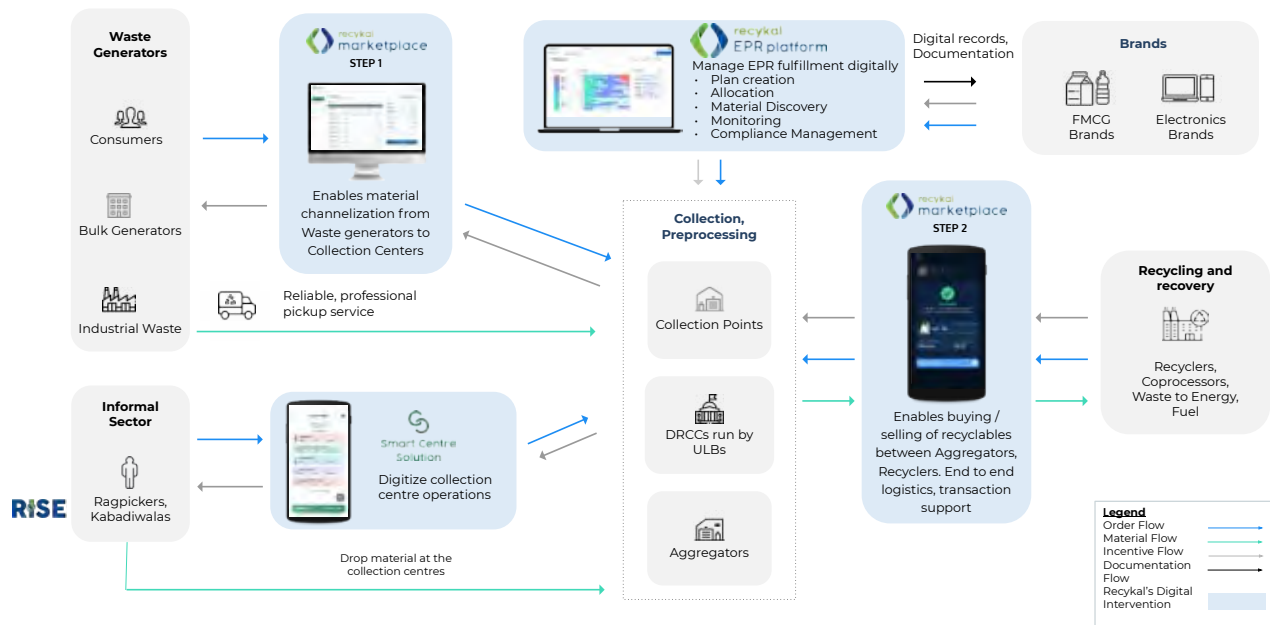
SALIENT FEATURES

- Recykal is India's first cloud-based platform to buy and sell recyclables to accelerate India's circular economy shift.
- Provides Pan India tracing of waste streams
- End to end traceability, transparency and efficiency of all transactions
- Access to a pan India network of registered recyclers, willing to pay premium prices
- Access to rich actionable data and analytics by geography
- Enabling formalization of informal sector participants
- Improved monitoring and governance mechanisms
- Tech-enabled EPR target fulfillment

ECONOMIC ASPECTS

- Generation of revenue from waste.
- To benefit economically the informal sector players (Ragpickers, Kawadiwalas) through better revenues

Recykal's Waste Ecosystem





SUSTAINABILITY ASPECT

- The cloud based platform helps to accelerate India's circular economy in the related sector.
- Facilitates Reuses & recycling of waste.
- Saves land, water bodies & atmosphere from waste & pollution

SUITABILITY AND AVAILABILITY

- This platform provides on-demand supply for e-waste.
- Platform and services readily available via websites and toll free call centers.

LIMITATIONS (IF ANY)

- The waste management includes dry waste only.

MARKET LINKAGES

- Software platform, which works and provides services across country.

The image displays the Recykal marketplace app interface. On the left, the app's logo is shown above a grid of service highlights. On the right, a smartphone screen displays the app's main interface, which includes a header with the date and a grid of product listings for PET materials. The service highlights on the left include: 'Bridges demand-supply gap', 'Provides pricing visibility', 'Helps locate category specific supply', 'CONSISTENT SUPPLY OF MATERIALS', 'DIGITAL PAYMENTS', 'ONLINE DOCUMENTATION', 'ORDER TRACKING, TRACEABILITY', 'END TO END LOGISTICS', and 'CUSTOMER SUPPORT'. The smartphone screen shows a grid of product listings for PET materials, including 'White Baked PET First Grade' at ₹28.32, 'Brown Baked PET First Grade' at ₹45.34, 'Green Baked PET First Grade' at ₹23.00, and 'Brown Baked PET First Grade' at ₹64.43. Each listing includes a small image of the material and a 'View Details' button.

MAJOR PROJECTS

- The company is headquartered in Hyderabad, Telengana with five regional Offices and have pan India presence. As per the details, it serves 100+ Brands (Companies), 150+ Recyclers, 65+ Municipal Corporation/ Smart Cities, 1000+ business users, 20,000+ MT materials processed per month & 4,00,000+ App downloads.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- No details





**GLOBAL
HOUSING
TECHNOLOGY
CHALLENGE** INDIA

Indian Housing Technology Mela (IHTM)

C. Materials/Components

**(Doors, windows, Construction
Chemicals, Insulation, Plumbing,
Plastering, Machinery)**



“ जाकर के देखना चाहिए कि कैसे हो रहा है। टेक्नॉलॉजी का उपयोग कैसे होता है। हिसाब-किताब कैसे लगाया जाता है। ये अपने आप में शिक्षा का बहुत बड़ा एक दायरा बन जाएगा और इसलिए मैं देश के सभी युवा इंजीनियरों को, टेक्निशियनों को विशेष रूप से निमंत्रण देता हूं। इस लाइट हाउस से जितनी लाइट वो ले सकते हैं लें और अपनी लाइट जितनी उसमें डाल सकते हैं डालें, अपने दिमाग की लाइट जितनी लगा सकते हैं लगाएं... ”

– नरेन्द्र मोदी

CATEGORY BUILDING MATERIALS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

GLASS FIBRE REINFORCED CONCRETE PRODUCTS

Alternate to conventional building products based on cement concrete



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Glass fibre Reinforced Concrete (GFRC) is an alternate to cement concrete and is making a significant contribution to the economics, technology, and aesthetics of modern construction worldwide for over 50 years. GFRC is not a single material but a family of high-performance cement based composites reinforced with special alkali resistant glass fibres, which can be engineered to suit a wide range of applications in engineering, architecture. The typical raw materials used for GFRC products are cement, sand, water, admixtures and alkali resistant glassfibres. The GFRC products offers high toughness, high tensile strength, high ductility as compared to plain concrete. It is easy to cut and has high strength to weight ratio.

The various products are facades, sunscreens (grills), column cladding, capitals, brackets, keystone, window sill and door surround, cornices, ac cover, planters, landscaping items, corbels etc.



SALIENT FEATURES

- Resistant to Weather, Corrosion, Fire, Abrasion and Fungi
- Light Weight due to thin sections
- Non Combustible, Low Thermal movement, High Impact resistance
- Suitable In Earthquake Prone areas
- High Density With Low porosity
- Ease of forming Complex Shapes
- Very low maintenance
- Can Impart Any Surface texture & finish
- Easy to handle, Transport and fast to install
- Environmental friendly
- Proven Long term performance
- Mouldability
- GFRC is lighter as it is cast in thinner sections and therefore 75% lighter than similar pieces cast with traditional concrete
- High flexural strength and strength to weight ratio
- GFRC is made of glass-fibre and therefore there is no need of other kind of reinforcement which are difficult to place in complex shapes.
- Excellent surface finish and adaptable to fine details



ECONOMIC ASPECTS

- GFRC offers sustainable products having low life cycle cost and economical than the conventional cement concrete products.
- Being thinner sections, cost per sq.ft. is less than conventional products



SUSTAINABILITY ASPECTS

- Low toxicity raw materials
- Durable, long lasting materials reduce replacement, maintenance and repair
- Can be supplied prefinished to eliminate VOC's during painting
- GFRG products meets ASTM E136 and rated as green products
- Hurricane and missile impact resistant
- Lightweight GFRG panels use 80% less material than precast, reduces fuel and costs of transportation
- Reduced cement and energy usage
- Durable
- GFRG uses less cement than equivalent concrete and also often uses significant quantities of recycled materials (as a pozzolan), GFRG qualifies as sustainable.

SUITABILITY AND AVAILABILITY

- Suitable for all climatic conditions.
- Particularly suited for refurbishment of old buildings and changing facades.
- Available at all places. The plant can be installed near the project site if the quantum of product requirement is high.

LIMITATIONS, IF ANY:

- Skilled labours are required for handling and installation.



MARKET LINKAGES

- Available Pan-India.

MAJOR PROJECTS:

- Widely used in various projects throughout the country.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- IS. 6432:1984 - Methods to determine properties of glass reinforced cement material.
- Specification for the manufacture of GFRC GRCA0110.
- Pre-stressed concrete institute, USA.



CATEGORY

BUILDING MATERIALS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

WOODEN DOOR/ PANELS

Alternative to conventional wooden Flush/panel Doors



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Dormak is the manufacturer of premium quality doors using eco-friendly wood fiber material and its by-products as a raw material. Dormak doors consume lesser wood than any other traditional doors. Dormak products are manufactured with globally sourced material and technology to make premium quality doors. Dormak products are known as green doors and are approved for green projects. Dormak has been awarded for its eco-friendly quality mark “Trust-2015”.

Wood Fibre Moulded HDF Doors: Moulded Panel Doors are pre-primed and do not require base coat and are ready for paint or polish. High density fiber moulded door skin is used on both sides which is procured from world leader Masonite using 100% waste wood sourced from sustainable forest in Malaysia and USA. Various designs are available for interior use to suit customer’s choice. Solid or tubular core filler options are available. Special glue makes it environmentally friendly.

Wood Fibre Flat HDF Doors: HDF Flat Doors give a wide choice of finishes, textures and designs. They can be stained to give a rich natural look or contemporary shades to suit your home style. There is also a choice of wood grain textures or smooth door surfaces, which can make any room, look unique.

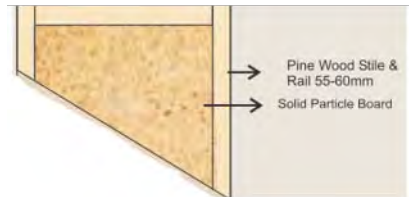
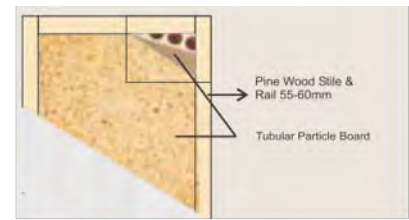


SALIENT FEATURES

- About 50% weight reduction.
- No bending, no damage under workload.
- Less noise pollution.
- Low operating cost.
- Fire protection.
- Thickness precision $\pm 0.1\text{mm}$
- Eco-friendly.

ECONOMIC ASPECTS

- Low maintenance cost.
- Simplified and quick installation.



SUSTAINABILITY ASPECTS

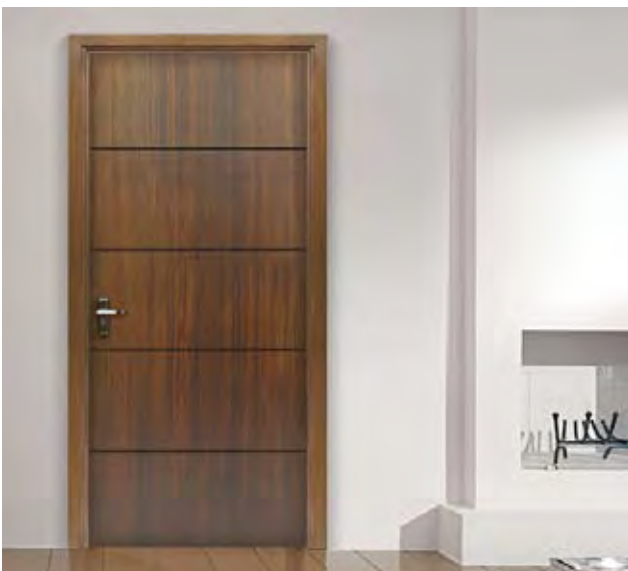
- Programme for the Endorsement of Forest Certification (PEFC) and Forest Stewardship Council (FSC) certified raw material used in manufacturing.

SUITABILITY & AVAILABILITY

- Suitable for low, medium and high rise buildings/individual houses.
- Strong enough to face drastic Indian weather changes.
- Dormak door gives half an hour fire rating.
- Reduces sound transmission/less noise pollution.
- Pan India sales and distribution network and export to other countries.

LIMITATIONS, IF ANY

- No limitation of technology.





MARKET LINKAGES

- Retail network spread across India
- Dealerships/franchises across India. Sales support and after sales support
- Technical and installation support
- Warranty claim and replacement

MAJOR PROJECTS

Dormak is associated with world's leading brands:

- Masonite International Corporation, U.S.A.
- Sauerland Spanplatte, Germany

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Programme for the Endorsement of Forest Certification (PEFC) and Forest Stewardship Council (FSC) certified raw material used in manufacturing.



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

CEMENT BONDED PARTICLE BOARD (BISON PANEL)

Alternative to conventional wooden boards/panels



Scan QR Code for
Video

CONTACT DETAILS

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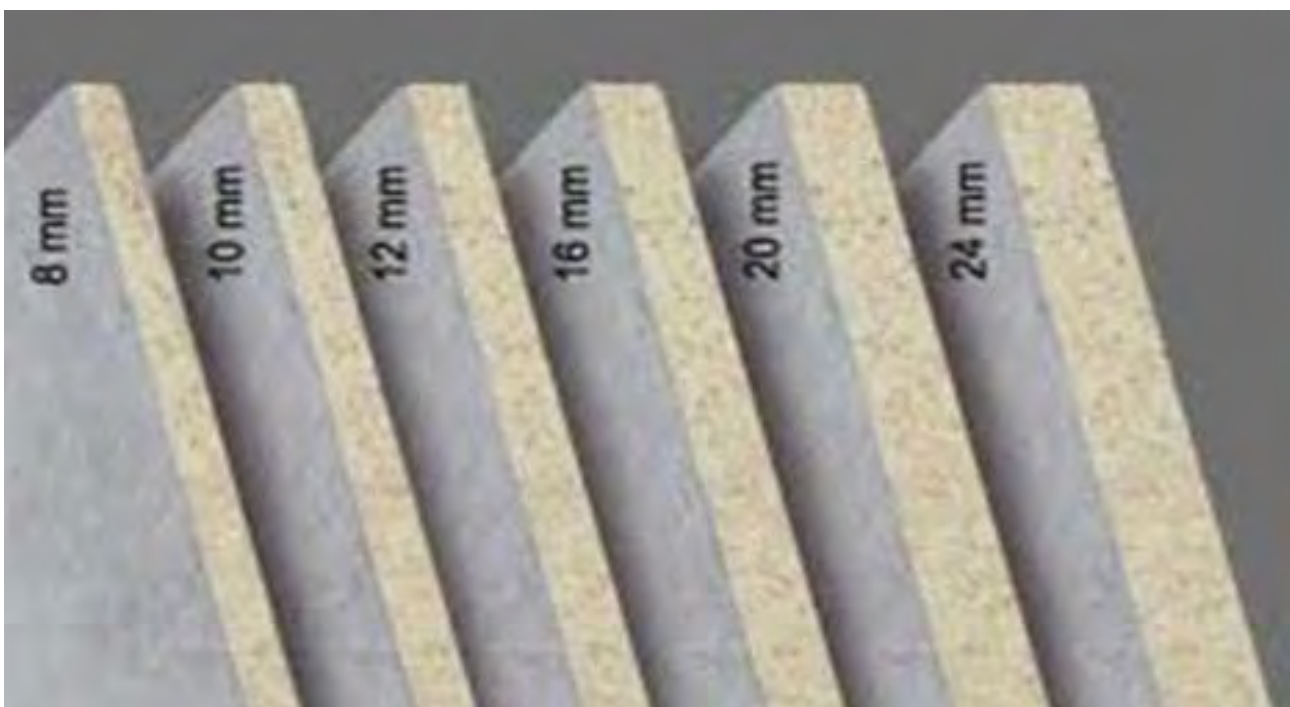
E-mails: amanbharti@bisonpanel.com

Mob: 9650131653, 9250415295



BRIEF

Bison Panel is a cement bonded particle board made out of about 62% cement & 28% wood and 10% of non-hazardous chemicals and water. The wood used is of fast-growing species like Eucalyptus/ Poplar, waste of wood logs. As the wood particles in the board are mineralized with chemicals during the manufacturing process, the particles become termite & vermin resistant. These panels are available in thickness of 6mm to 40mm used for various applications including internal and external. Due to adoption of a special manufacturing process, the panel acquires the strength & durability of cement, & the easy workability of wood - a combination of qualities absent in other boards. Cement is strong & durable, & is not affected by fire, weather, termites, etc. Wood is light & strong, & is easily workable.



SALIENT FEATURES

- Facilitates speedy construction.
- Texture and laminated, which are termite proof, moisture and fire resistance, durable, the life is more than 25 years.
- The boards are fire, water, weather, termite, vermin resistant, & do not support fungal growth.
- Bison Panel is highly fire resistant.
- With cement constituting 62% of its composition, Bison offers excellent resistance to weather.
- Bison is radiologically fit for use as per BARC (Bhabha Atomic Research Center) test reports.
- Highly sound proof material.
- Moisture resistant.
- No special machinery required for installation.

ECONOMIC ASPECTS

- Bison is affordable and cost saving.
- Construction with Bison is, extremely, time efficient. Resulting in additional savings in labour & transport.
- Bison structures can be dismantled with ease & transported elsewhere.



SUSTAINABILITY ASPECT

- Bison is eco-friendly with IGBC certificate & GRIHA / SVAGRIHA compliance.
- Environment friendly as includes use of agro-industrial wastes, using farm wood or waste of wood logs.

SUITABILITY AND AVAILABILITY

- Bison contains no hazardous material like Asbestos or Formaldehyde. Its process dust is harmless.
- Bison Panel has innumerable applications - it can be used in all places where an ordinary particle board can be used.
- Suitable for all kind of weather -40 to +90 Celsius.
- For applications involving furniture which is not required to be moved often, Bison is both economical & durable.
- Bison Panel confirms to I.S. 14276 / 2016.

LIMITATIONS, IF ANY

- The product does not offer much insulation properties.
- The product is not recyclable.



MARKET LINKAGES

- The product is available across India.

MAJOR PROJECTS

- BMTPC Demonstration Housing Project, (G+3 House), Hyderabad

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- IS: 14276:2016, IS: 1578BIS – 14276:1995
- ISO-9001:2008
- GRIHA CERTIFIED
- IGBC CERTIFIED
- DNV- Management System Certificate
- CE Certified
- FSC certified
- Radioactive Test by Department of Atomic Energy
- Fire test by CBRI
- Thermal Conductivity test by ISOLLOYED
- STC Test by Prasara Bharti



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

PAINT, PUTTY MATERIALS

Putty and Paints for various applications



Scan QR Code for
Video

CONTACT DETAILS

M/s NCL Buildtek Limited

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BRIEF

The company manufactures Alltek Acrylic Putties & Textures, range of ready-made putties, with excellent acrylic binders, anti-cracking, anti-foaming, anti-fungal, anti-rusting agent's quality for walls. White cement based, dry wall care putty consisting of high quality polymers and other fine aggregates. Grey cement based polymer modified dry mix coarse material for direct application over uneven plastered brick walls/concrete surfaces.

Alltek superfine putty is an Interior grade ready mix paste for application over levelled sand finished cement plastered walls and ceilings, panel boards like gypsum & bison panels etc. alltek superfine is made for ease of application in a ready mixed paste form with specially selected inert mineral fillers, antifungal agents to protect the material and finished surface in an acrylic binding medium for good surface adhesion. alltek superfine material is sprayable on to the surface with a spray unit for fast track projects, saving project time. alltek superfine can be applied directly over cement plastered surface with out applying primer coat, because of its good surface adhesion, and alkaline resistance, thus saving primer cost over cement walls.

NCL Alltek deco orient texture base is a decorative architectural plaster for application on exterior surfaces. This base material has excellent binding to the surface where applied, does not show surface cracks, and offers good flexibility. Alltek deco orient base is supplied in different grades - small, medium, big and jumbo lines offering wide choice to the architects, builders and individual customers creating different surface patterns. NCL Alltek deco orient base is made with marble powder, silica sand, quartz, in a rich acrylic binding medium. Deco orient is also supplied in natural colours for direct application over the surface.

NCL Paints

NCL Delight is an economical grade acrylic distemper in ready to use paste form for application over interior surfaces. Delight is offered in many pleasing light and dark shades to suit various colour combinations. Delight apart from surface protection and beauty to the surface also offers good washability, resistance to common bacteria & fungus.

NCL Gaiety is an economical grade of interior acrylic emulsion paint. Gaiety offers good wash ability, surface

protection and smooth finish to interior surfaces. Gaiety also gives good resistance to common bacteria and fungi.

NCL flora is an interior premium grade emulsion paint formulated to impart very smooth interior paint finish in a variety of colours. NCL Flora apart from smoothness and pleasing colours also has good water, bacterial and fungal resistance. The specially chosen acrylic binder gives excellent surface adhesion.

SALIENT FEATURES

Texture Plaster

- Ready mixed paste for direct application.
- Water resistant.
- Easy application.
- Long durability.
- Surface finish can be made in different forms.
- Gives wall a beautiful and unique finish.
- Creates unique designer patterns of choice.

Putty

- Ready mixed paste for direct application.
- Easy application.
- Long durability.
- Smooth or textured finish.
- Inherent flexibility and is less prone to cracking.
- Very economical.

Paints

- Interior smooth finish.
- Economical.
- Easy application with a brush / roller.
- Good coverage.

Acrylic Emulsion Paints

- Smooth interior emulsion.
- Economical.
- Easy application with a brush / roller.
- Good coverage.



ECONOMIC ASPECTS

- Good coverage and durability of products makes them economical.

SUSTAINABILITY ASPECT

- Not reported

SUITABILITY AND AVAILABILITY

- Ready- made putties, with excellent acrylic binders, anti-cracking, foaming, fungal, rusting agent's qualities.
- Surface adhesion, workability and surface smoothness

LIMITATIONS (IF ANY)

- Requires leveled surface to work.



MARKET LINKAGES

- Available Pan India.

MAJOR PROJECTS

- Airport Authority of India , Head Quarter Building , Mahipalpur
- Projects executed for Haryana Police under NS Item
- Himachal Pradesh PWD – Mini Secretariat Building , Auditoriums
- Project executed for Punjab PWD Judicial Complexes

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- S.O.R. Chhattisgarh.
- NBCC.



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

COLOUR COATED GI DOORS AND WINDOWS

Alternative to conventional wooden/M.S. windows



Scan QR Code for
Video

CONTACT DETAILS

M/s NCL Buildtek Limited

Contact Person: Sh. B.D.Makhija & Sh. Shailendra Pratap Singh

Address: D-82, IInd Floor Malviya Nagar, New Delhi-110017

E-mails: makhija.bd@nclbuildtek.com,

pratapsingh.s@nclbuildtek.com

Mob: 9929597971, 9823335674



BRIEF

The company manufactures colour coated GI doors and windows using colour coated G.I. sections which are unique 'Roll Formed' closed sections with precision made on a 32 station forming line. These sections are subsequently fabricated into Doors, Windows, Partitions, Structural Glazing etc. using high quality accessories and EPDM gaskets. The products are eco-friendly as power consumption during manufacturing is less than aluminium and wood is not used.

Cold rolled steel coil made up of base steel as per IS 513 grade "D" quality, galvanized as per IS 277 with zinc coating of 120 grams/sq.mts is used. The roll formed section are powder coated with pure polyester powder up to 50-60 microns thick.

Doors & windows of Seccolor range are assembled with high quality hardware made of either with high grade aluminium, crca electroplated or glass filled nylon. Gasket is made up of ethyl propylene diamine monomer (EPDM).



SALIENT FEATURES

- Strong: The intricate shapes and seaming of the ends gives lot of strength to the sections.
- Durable: As the steel is galvanized, phosphated, color coated and Assembly is weld less the outfits are durable.
- Elegant: The shapes of the profiles, combination of colours and their matching components offer elegance beyond compare.
- Perfect Sealing: The gaskets around the glass and around the shutters are designed to give perfect sealing to prevent leakages of sound and dust, power saving in Air conditioned rooms when windows & doors are closed.
- High in UV Resistance

ECONOMIC ASPECTS

- Durable & zero maintenance

SUSTAINABILITY ASPECT

- Eco friendly, Energy efficient



SUITABILITY AND AVAILABILITY

- Custom made and off-site fabrication
- Cold rolled steel coil made up of base steel as per IS 513 grade “D” quality, galvanized as per is 277 with zinc coating of 120 grams/sq.mts.
- Green Produce (IGBC)
- Products are customized and easily available in market, Having Regional Offices and Dealers network all over India.

LIMITATIONS (IF ANY)

- It should be with primer coat of epoxy primer of 5-7 microns thick, finish painted with polyester paint of 12-16 microns thick and back coated with alkyd backer of 5-7 microns.

MARKET LINKAGES

- Available Pan India



Glimpses from Hon'ble Prime Minister's visit to IHTM stalls



Glimpses from Hon'ble Prime Minister's visit to IHTM stalls



MAJOR PROJECTS

- AIIMS- Bathinda, AIIMS- Bilaspur, AIIMS Guwahati, AIIMS Rishikesh
- MES (MES, WAC, DRDO, Navy) All Over India (MAP Accn, OTM Accn, KLP Accn, Hangers,)
- Projects executed for CPWD- NSG Manesar, ISI Delhi, IIT Delhi, IIT Ropar, CIPET-Jaipur, CRPF Camp Sultanpur
- Projects executed for UPRNNL- Engineering College, Medical College, 300 Bedded Girls & Boys, ITI, and Type 4 Qtrs.)
- Projects executed for RSRDC, PWD Punjab, PWD-HP, PWD H.R.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- PWD SOR- Haryana, Punjab, Odisha, Andhra Pradesh, Telangana,
- MES- All Over India
- CPWD- ADG-Chandigarh (North Zone)



CATEGORY BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

FIBRE GLASS BASED CLADDING FOR INSULATION AND ACOUSTIC PURPOSE

Alternative to conventional insulation products



Scan QR Code for
Video

CONTACT DETAILS

M/s U P Twiga Fiberglass Ltd.

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BRIEF

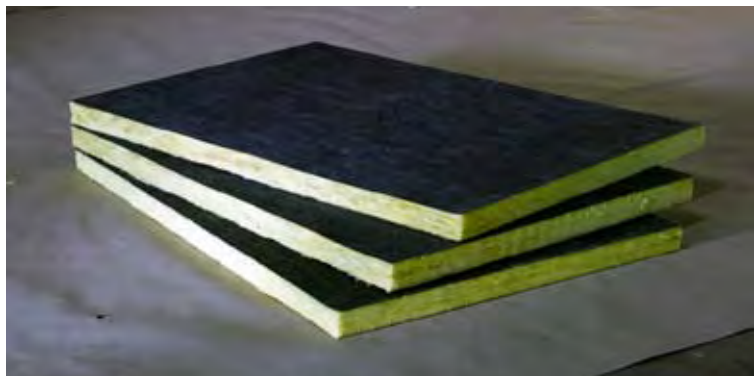
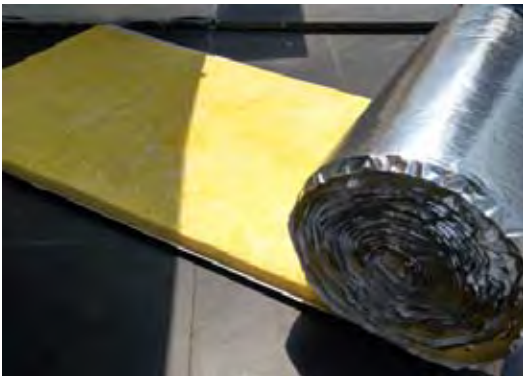
The company manufactures Fibre Glass Wool insulation products with good fire properties, resiliency and integrity. One of the recognized products for thermal and acoustic insulation, TwigaInsul is light gold in colour and is a light weight, compressible insulation material consisting of fine, long, inorganic glass fibres bonded together by a thermosetting binder.

TwigaInsul is available in flexible blankets (rolls) and slabs or boards, in various densities and thicknesses and with a wide range of factory applied facings which include reinforced fire rated aluminium foil, glass tissue, black glass tissue and a wide range of imported premium facings.

Cooling costs in a building insulated throughout with glass wool can be reduced significantly. The use of glass wool for the thermal insulation of external walls and ceilings has been shown to reduce energy consumption by 20% to 30%.

Twiga Glass Wool with its outstanding acoustic performance has excellent acoustic absorption characteristics. Whether it is sound insulation for industry, commercial premises, public buildings, or domestic applications, TwigaInsul outperforms others.

TwigaInsul glass wool made from pure silica sand will not support combustion even in direct, prolonged contact with flames. It does not emit toxic fumes or smoke, which are the two biggest health hazards during fire.



SALIENT FEATURES

- Good thermal insulation & acoustic insulation product
- Fire safe insulation Product
- Environment Friendly Green product
- Light weight, resilient & sustainable insulation
- Quality complying with national and international project requirements. Inorganic and quite inert type of insulation, hence very durable. When applied properly, it performs well through majority of the lifespan of a building.
- High Sound Transmission Class, excellent noise reduction co-efficient, non-combustibility (fire safety), Low fire propagation and Zero Flame spread and many other application oriented criteria etc.

ECONOMIC ASPECTS

- Saves energy cost – highly cost effective and provide excellent ROI.
- Excellent resource efficiency – most raw materials are acquired locally. It saves much more energy than it consume during production. Less water requirement in manufacturing.

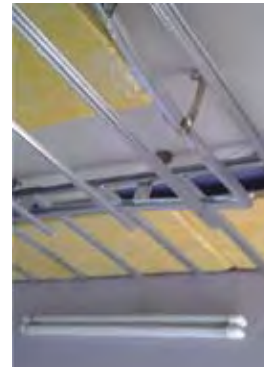


SUSTAINABILITY ASPECT

- The product has no VOC, ODPs or any other hazardous content. Owing to its excellent thermal properties, it helps to save energy consumption in a building.
- It meets all the major (insulation) criteria of Green Building. It is certified as Green Pro from CII IGBC. Certification (CII-IGBC green product approval).
- Reduces heat transfer across the insulated structure, hence saves lots of cooling or heating energy.

SUITABILITY AND AVAILABILITY

- As the material is light-weight and available in user-friendly sizes.
- As it is easy to lift, carry, lay and install. Skilled & Unskilled worker can apply the product. Time to time we are providing training to the contracting companies to ensure quality installation.
- Inorganic and quite inert type of insulation, hence very durable. When applied properly, it performs well through majority of the lifespan of a building. Superior quality complying with national and international project requirements.
- Have a wide network of channel partners across India for domestic business and also in South East Asian countries for export business.



LIMITATIONS , IF ANY

- As per Manufacturer's Specification

MARKET LINKAGES

- Available Pan India

MAJOR PROJECTS

- Supreme Court of India for building insulation and HVAC insulation- 30,000m²
- Jawaharlal Nehru Bha-
wan – Green Building Delhi- Wall insulation and acoustic insulation – 20,000m²
- CAPFIMS Hospital Delhi – Partition wall & Underdeck Insulation- 25,000m²
- AIIMS – various location- 100,000 m²
- Delhi International Airport Ltd – 500,000 m²
- Mumbai International Airport Limited – Various applications and quantities
- Delhi Metro Rail Corporation Ltd.
- Airport buildings (AAI) – various location
- IIT – various buildings - Delhi and other locations
- Many more Government project, infrastructure projects, green building factory/warehouses projects all over India and Southeast Asia

CERTIFICATION/INDIAN STANDARDS/ENDORSEMENT

- ISI 8183:1993 specifications for bonded mineral wool
- Green Pro certification (CII-IGBC green product approval)
- Singapore Green Building Product certification
- ISO 9001: 2015



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

PRE PAINTED GALVANISED IRON WINDOWS

Alternative to conventional wooden/M.S. windows



Scan QR Code for
Video

CONTACT DETAILS

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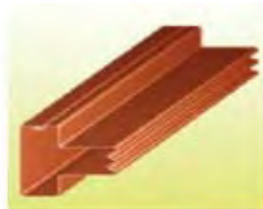


Elixir

BRIEF

Pre Painted Galvanised Steel Windows with Pre Painted Steel window profiles are manufactured by the company using Direct Roll Forming Technology. Roll forming is an efficient, effective shaping that delivers tight tolerances on complex profiles. Material quality and Standards. Advantages include:

- High Volume capacity.
- More flexible and responsive than press braking or extrusion.
- Ultra-precise processing to very tight tolerances with excellent part uniformity and superior surface finishes.
- Creates stronger & lighter structural components using less steel.
- Ability to form complex shapes.
- Ability to incorporate secondary operations such as punching and notching in line. Thickness of 0.55mm with grill provision manufactured & customized as per the requirement



SALIENT FEATURES

- Completely closed Pre Painted Steel Windows
- Light in Weight
- Very good Strength & durability. (life upto 50 years)
- Strong and Durable.
- Light in weight and easy to erect.
- Perfect sealing. Withstands heavy wind speeds.
- No dimensional deformation with seasonal variation.
- Quality as per international standards.
- Termite Proof. Good fire resistance.

ECONOMIC ASPECTS

- Maintenance free & Economical.
- No painting and no maintenance required.



SUSTAINABILITY ASPECT

- Green Product, the product is replacement for wooden windows and MS windows.
- Environmental Friendly.
- The System envisages conserving wood and low consumption of fuel.

SUITABILITY AND AVAILABILITY

- Applicable in all type of Weather Conditions.
- Dealer network across Pan India material can be supplied all over India.
- Strong: The intricate shapes and seaming of the ends give tremendous strength to the profiles.
- Durable: As the steel is galvanized, phosphate, color coated and the assembly is weld less the out fits are durable
- Perfect Sealing: The Gaskets around the glass and around the shutters are designed to give perfect sealing.



LIMITATIONS , IF ANY

- Not reported.

MARKET LINKAGES

- Easily Available.

MAJOR PROJECTS

- APTIDCO- Andhra Pradesh (around 1 Lakh Houses),
- Telanagan-2BHK Dignity Housing Project (Around 50000 Houses).

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- ISO 9001:2015 Company



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

MAGIC XP (ELASTOMERIC PAINTABLE PLASTER) & OTHER PRODUCTS

Alternative to conventional putty/plaster/water proofing film



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Elastomeric Paintable Plaster is a paste made with minerals, plasticizers and exterior grade polymers to be used as a putty /plaster / water proofing film. It could be used as a binding material to paste tiles, stones and bricks. The product has following characteristics:

- Elastomeric: Can expand and contract to the climatic conditions.
- Paintable: No primer required.
- Plaster: If applied thick , it could be called as a plaster and when applied thin it is called as paint.
- Co-efficient of Expansion: Has an excellent co-efficient of expansion. Does not crack between temperatures of 0-50 degree Celsius.
- Exterior Grade: Can be used in the exteriors and interiors .
- Water Resistant: has excellent water repellant property.
- Crack Free : Can be used as a crack filler and also ensure that cracks do not develop on the entire plane. Can be used as a Preventive n Corrective measure.
- AAC Blocks: Blocks can be pasted with Elastomeric Paintable Plaster to create partitions and can be used as a paintable plaster to ensure a crack-free finish.
- RCC Structure/Ceiling: Can be applied on such surfaces directly without hacking or using a bond.
- Tiles / Stones can be pasted with this directly on any surface , AAC Blocks and RCC surfaces because of its excellent adhesion properties
- Elastomeric Paintable Plaster can be made available in colours to cut down on the cost of painting.
- Pre-mixed paste form. No need to add or delete anything. No adulteration is possible.
- No curing required and it is self-curing.
- Self Levelling. Can be used as a levelling compound.
- Human friendly. No need to sand the surface.



SALIENT FEATURES

- Can withstand high temperature fluctuations,
- Does not require sanding pre and post application,
- No primer needed before paint application as primer is premixed in this,
- Can be loaded upto a thickness of 25 mm so as to use as plaster,
- Colored Magic XP can be used to paint the house without a brush.

ECONOMIC ASPECTS

- Cost Effective. The sequence of the activities is reduced and hence helps speedy execution and at lesser cost.
- Wastage is ZERO. No residue is left during application.
- No Sanding No Primer required before application.
- Washable Putty. No wastage of material as it is reusable for longer durations,



SUSTAINABILITY ASPECT

- Saving of natural resources like sand and water.

SUITABILITY AND AVAILABILITY

- Can expand and contract to climatic conditions.
- Elastomeric Washable, Scratch Free.
- Anti-Fungal Anti-Bacterial Self Curing. Water Repellent
- Excellent Shelf-life.
- Excellent performance under all climatic conditions once dried completely.
- Available through dealer/ distributor in Mumbai, Delhi and is under process of making new dealers at other states.
- Eliminates all types of cracks Can be loaded with a roller and swiped with a trowel and blade Can be used as a leveling agent to a thickness of .5mm to 25mm Can be applied in color and do away with painting Creates a smooth and non-water-absorbent surface without sanding or priming.



LIMITATIONS, IF ANY

- As per Manufacturer's Specification

MARKET LINKAGES

- Easily available.

MAJOR PROJECTS

- Sobha International City : Crack filling and surface application : 2-3 tonnes
- Samarth Chintamani Group : Pasting Door frames and window frames and crack filling 40 tonnes
- Adani group : AAC blocks crack filling and surface application interior and exterior 4-5 tonnes
- B G Shirke: Pre-engineered buildings, crack filling and surface application 3-4 tonnes.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- PAC by BMTPC and QACA certification for innovative product



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

WATER PROOFING COMPONENTS / ADMIXTURES

Alternative to conventional water proofing components



Scan QR Code for
Video

CONTACT DETAILS

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Contact- 1204021760/61



BRIEF

CHRYSO offers a comprehensive range of innovative solutions for ready-mix concrete at the plant or on site and a wide range of solutions to cover all wet cast and dry cast requirements. CHRYSO solutions are dedicated to improve concrete performance, production, workability, aesthetics and sustainability.

CHRYSO® STRUCO EXCEL is a heavy duty damp proofing (water repellence) admixture for concrete, mortars and any type of cementitious renders. The presence of this integral compound resists and reverses the normal tendency of hardened concrete to absorb water by capillary action and makes the concrete totally sealed against penetration of water (or liquids). CHRYSO STRUCO EXCEL conforms to IS: 2645-2003.

- Ensure complete water repellent concrete.
- Eliminates / Reduces dampness from the plastered surface of the brick work.
- Protects concrete from weak acid / salt solution, oil and hydrocarbons.
- Prevents / Reduces sweating, efflorescence, saltpeter action.
- Resists fungal growth on the plastered surface of the brick.

CHRYSO CWA10 Crystalline waterproofing admixture protects and waterproofs concrete structures by crystallization. The active chemicals react with moisture and by product of cement hydrate in the concrete resulting in crystalline formation within the pores and capillary tracts of concrete thus waterproofing the structure against penetration of water and other liquids from any direction. CHRYSO CWA 10 gives strong and lasting waterproofing protection from harsh environmental conditions. CHRYSO CWA 10 conforms to IS 2645-2003 and ACI 212.3R-10:

- Mixed with concrete at the time of batching
- Sealing cracks or voids up to 0.5mm by crystal formation
- Protects concrete exposed to harsh conditions.
- Crystals are insoluble in water therefore voids are sealed permanently.
- Compatible with all types of concrete plasticizers / superplasticizers.
- There is no need to alter the existing mix design, just add recommended dosage of CHRYSO CWA 10 in existing design of concrete mix.



SALIENT FEATURES

- Developed very high-range water reducing super plasticizers to deliver better strength and an improved finish of the fresh concrete
- News solutions to increase long distance and vertical concrete pumping. Fostering the production of low CO₂ concrete in partnering with innovative start-up and major players/stakeholders of the construction industry.
- Combines mix design know-how and new concrete solutions to deliver exceptional fluidity, a rapid filling of complex mould and an excellent surface finish quality.

ECONOMIC ASPECTS

- Causes low maintenance cost.

SUSTAINABILITY ASPECT

- No side effect on fresh as well as hardened concrete.
- Fostering the production of low CO₂ concrete in partnering with innovative start-up.

SUITABILITY AND AVAILABILITY

- Non-toxic and non-hazardous for drinking water.
- Compatible with all types of concrete plasticizers / superplasticizers.

LIMITATIONS (IF ANY)

- As per Manufacturer's Specification.

MARKET LINKAGES

- Easily available

MAJOR PROJECTS

- Not reported

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Not reported



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

PLUMBING, PIPE FLANGE, COLLAR, WATERPROOFING MEMBRANE, WATER SEAL TAPE AND ELECTRICAL PIPE COLLAR

Innovative products for waterproofing of plumbing works



Scan QR Code for
Video

CONTACT DETAILS

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Rashi Marketing

BRIEF

The company has designed & developed Ethylene Propylene Diene Monomer (EPDM) rubber based Pipe Collars for waterproofing of Nani Trap (Drainage) Plumbing Pipe Joints and Core cut and other the Innovative waterproofing Products .The description of these products is as follows:

- WPE55 PIPE COLLAR (CORE CUT) is developed to arrest the water leakages through the core cut done in the slab. Pipes are saved from seepage/Leakages Core Cut packing is the process of fixing Plumbing pipes in RCC members (Slabs or beams or RCC walls) in their cutouts/ core cuts.
- WPE55 Pipe Collar for Nani Trap (Drainage System) is developed to arrest the water leakage/seepage through the inside portion of the bedding material above the Nani trap. After placing of the Nani trap on the floor, the bedding material is casted to maintain the slope, but the inside portion of the bedding material, i.e. the inside portion between nani trap and bedding is not waterproofed, this is source of leakage/seepage. WPE55 Pipe Collar completely seals/covers this gap and allows to flow into the Nani trap.
- The WPE56 PUDDLE FLANGE is suitable for all standard pipes in steel, plastic, stoneware, concrete and cast iron etc. have been specifically designed for the pressure-tight installation of pipelines in concrete walls, foundation plates and manholes. WPE56 Puddle Flanges are pressure-tight water, diffusing media such as gases (e.g. radon) and hydrocarbons (e.g. oil, petrol).

The WPE56 PUDDLE FLANGE is an extremely flexible product available in a range of versions. A perfect solution for any application. Easy to install. Cost-effective alternative to conventional sealing systems. WPE56 PUDDLE FLANGE is an economical and reliable method of hydrostatic sealing, the ideal solution where ever it is not possible to retrofit sleeves or core holes.

The puddle Flanges is designed to prevent leaks around pipelines



Pipe Collar (Core Cut)



Puddle Flange

penetrating poured concrete walls, floors, shafts, tanks, pools, manholes, and structures. The flexible gasket is installed during construction on the outside diameter of the pipe where a water tight seal is required. The unique flexible design bonds to concrete and compresses. The PUDDLE FLANGES are made in EPDM. EPDM is chemically resistant to a wide range of acid and bases. It also offers outstanding weather and ozone resistances.

- WPE55 Pipe collars with fleece with expansion zone is a waterproof and permanently elastic sealing product. It's made from thermoplastic elastomer, both side special non-woven and centrally inserted TPE rubber layer.

The product ensures excellent compatibility and good adhesion with polymers dispersion, flexible mineral sealing compounds and thermosetting resins. However, it is advisable to conduct a compatibility test before applying other products.

Applications: For permanently sealing wall and floor pipe passages in common with embedding materials, underneath ceramic tiles or natural stones, in outdoor or indoor construction parties like, bathrooms, showers, balconies, terraces etc. It's highly resistant on hydrostatic pressure and vapor permeable, tear proof and chemical resistant. Very good behavior on temperature differences.

Limits: Product has to be stored in a cool and dry place, not to expose to direct sunlight. Use the tape within 24 months after receipt.

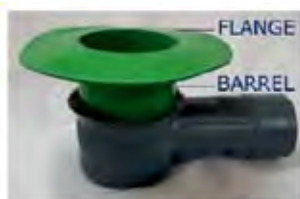
- WPE-55 SEAL TAPE:
The product gives leakage proof roofs and damp free walls. It comes with ozone fighting molecules. It can be used for various application like Plumbing Joints, landscaping, fountains, swimming pools, suspended plumbing and more.

Application process: Remove the yellow film, wrap 3-4 rounds on joints before plastering. Stretch the tape at least three quarters of the original width. More the stretch tighter is the seal. Overlap quarter of the tape again.

- WPR55 WATERPROOFING MEMBRANE
WPE-55 membrane consists of a non-bituminous compound reinforced and protected on both sides with a non-woven polypropylene developed for floor and walls. It is developed for the waterproofing of internal/ external walls like bathroom, kitchen, terrace, toilets, construction



Seal Tape



Place the WPE55 Pipe Collar adjusting the height of the bedding material



Shows that the Inside portion of the bedding is covered with barrel of WPE55 Pipe Collar



Ready for tiling

Rashi Marketing

joints, swimming pools, basements, retaining walls, rising dampness, chajjas, or wet areas with a risk of water infiltration.

The application is simple and non-polluting. It is mainly used as a sandwich layer for waterproofing. On this layer, other layers of protection and decoration are needed. When applying, pour the adhesive materials homogeneously on the smooth surface, then roll the membrane to make it fully adhesive for fitting WPE-55 water proofing membrane on floors and walls.

Characteristics of Membrane:

- Waterproof, Anti- Ageing, Anti-Cracking.
- Non- toxic, environmentally friendly product,
- Excellent adhesion with many surfaces, especially direct adhesion to cement material in its curing process.
- Tough, impermeable, multi-layered sheet, High tensile strength, good cold flexibility.
- Thin, flexible, compatible with common cement screeds and resistant to most common alkaline solutions.
- It creates a separation layer between surface and the floor/walls.



Waterproofing Membrane



SALIENT FEATURES

- Cost effective solutions to arrest the seepage /Leakages around Plumbing and electrical Pipe,
- Saves water and building structure from further damage due to water leakages
- Durable upto 20 years.



Rashi Marketing

ECONOMIC ASPECTS

- Reduces the cost of repair due to no seepage /Leakages.

SUSTAINABILITY ASPECT

- Saves water and building structure from further damage due to water leakages.

SUITABILITY AND AVAILABILITY

- Applicable to all Climatic conditions.
- Developing Dealer/applicator Network Pan India.

LIMITATIONS, IF ANY

- As per Manufacturer's Specification

MARKET LINKAGES

- Easily available

MAJOR PROJECTS

- Individual Houses
- Brightland Hotel at Mahableswar

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- New product.



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

POLYURETHANE BASED WATER PROOFING COATINGS

Alternative to conventional water proofing coatings



Scan QR Code for
Video

CONTACT DETAILS

M/s Alchimica

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BRIEF

Alchimica's Polyurethane products' are manufactured in Europe to the International Standard. Polyurethane systems are applied in liquid form. Unlike preformed membranes, Polyurethane liquid membranes are laid without any joints. They cure to yield seamless membranes with excellent subsurface adhesion & long-term flexibility.

The logic of liquid applied membranes take any shape for Waterproofing & Concrete Protection penetrate through pores and cracks & fill the voids of strong slabs Waterproofing continues even after minor seismic activity as PU elongates the self-levelling property allows equal spread & reduces human errors Reduce tile cost & provide a seamless protective covering for the roof.



Raft Waterproofing



Retaining Wall waterproofing



Roof Gardens



Terrace waterproofing



UG/ OHT Tanks



STP Tank Waterproofing



Toilets Waterproofing



Flooring



Seamant Application



SALIENT FEATURES

HYPERDESMO P2K

Seamless with High Elongation > 2000 %.
 Confirms ASTM C 836
 Long Shelf life.
 Inherent Anti root properties for Landscape use.
 Classic polyurethane with polymerized bitumen.
 Self leveling to develop thickness in one coat.
 Strong adhesion to any substrata (>20Kg/ Sqcm).
 Cures with humidity in the atmosphere.
 Very low water absorption. (0.9%)
 Expected service life – 25 years.



Water based Coatings Aquasmart®

Can be used in exposed & covered areas.
 Seamless & Fast curing.
 Solvent free -0% VOC
 Good Elongation
 Long lasting



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

ULTRATECH HIGH PERFORMANCE CONCRETE MIX (DURAPLUS)

Alternate to conventional concrete.



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

UltraTech Durapplus is a special concrete which comprises of more than 50% replacement of cement by mineral admixtures as binder such as fly ash, slag, microfine slag, micro silica etc & highly engineered fibres in order to control permeability and micro cracks and enhance the durability of structure. Its highly engineered design mix, ensures resistance to chlorides and sulphates & increases the service life of the structure.

It is specially designed for residential construction so as to provide a long lasting strength to the structure, along with easier and faster construction. The Durapplus concrete can be used in foundations, walls, slabs, beams and columns of building and infrastructure.



SALIENT FEATURES

- Reduction in carbon footprint with high (more than 50%) replacement of cement with mineral admixtures.
- The production of 1 tonne of cement generates about 1 tonne of carbon dioxide in the atmosphere.
- Increased flow of concrete to minimum of 450 mm, helps reduce use of manpower and fuel /electrical energy for compaction of concrete.
- Ease of handling
- Reduction in honeycombing
- Faster placement reduces the duration of manpower and equipment required. This results in enhanced energy efficiency & faster construction.
- Water Penetration < 15 mm, tested as per DIN 1048. Results in almost 30% extension to the life of structure due to less porosity of the concrete.
- Low rapid chloride penetration Test (RCPT) value (<2,000 coulombs), gives the concrete immunity against environmental attacks.
- The repair & maintenance cost is reduced.

ECONOMIC ASPECTS

- The basic material cost is less than regular site mixed concrete as mineral admixtures used are available amply as by-products from industries such as steel plants and thermal power stations in the form of FlyAsh, Slag, Microfine Slag, Microsilica etc.
- Reduction in manpower, equipment and fuel by half therefore the energy consumption shall be half.
- The life cycle cost of the structure is reduced.





SUSTAINABILITY ASPECTS

- The limited availability of cement quality natural resource limestone, needs to be used judiciously, to cater to the construction industry and sustain for longer period.
- The cement replacement of 50% by mineral admixtures, will contribute significantly in extending the use of available lime stone resources.
- Almost 30% extension to the life of structure due to less porosity of the structure
- Reduction in plastic shrinkage cracking.

SUITABILITY & AVAILABILITY

- As this concrete is impermeable & durable, it is suitable for almost all concrete applications.
- Suitable for all regions/climates based on the availability of suitable mineral admixtures.
- The product is available Pan India.

LIMITATIONS, IF ANY

The mineral admixtures need to conform to required specifications.

MARKET LINKAGES

- The product can be supplied Pan India.





MAJOR PROJECTS

- Gurukrupa Realcon, Ghatkopar, Mumbai,
- Maheshwari Developers, Attapur, Hyderabad,
- Maheshwari Mega Ventures, MPM Time Square Mall, Hyderabad,
- Chandra Laxmi Infrastructure Ltd, Nagpur,
- Brigade Enterprises Ltd, Chennai,
- Shree Krishna Coporation, Surat,
- Larsen & Toubro Limited, Mumbai and Navi Mumbai,
- L & T Geo Structure Pvt Ltd, Chennai,
- Shree Vijay Laxmi Steels, Vizag,
- CEEBROS Hotels Pvt Ltd, Chennai.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Green Pro Certified



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

PLASTERING MACHINE

Alternative to conventional Manual Plastering



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Bapro Plastering Machine (Mixer Type) & Ceresit (Henkel Company) is a thin layered finishing wet Plaster CT174 Machine. Ceresit Ct174 machine is advanced coating product, with ease and speed of application and superior quality, increasing overall life span of façade plaster and walls. It is used for both sand cement and gypsum-based plaster mortar. Machine has a function of mixing of dry mix mortar with water and rendering/spraying of prepared mortar on substrate.

SALIENT FEATURES

- Cost Effective & energy efficient
- Bapro Plastering Machine uses polymer modified dry mix plaster, therefore less use of sand, cement and limestone.
- Accurate mixing of dry mix with water resulting in good consistency of prepared mortar, and high quality & durable plaster.
- Labour saving is up to 60%
- Time Saving in operation is up to 4 times





ECONOMIC ASPECTS

- Cost Effective (Less manpower and material required)
- Saves operation time.

SUSTAINABILITY ASPECT

- Energy efficient
- Less use of sand, cement and limestone.

SUITABILITY AND AVAILABILITY

- Both Machines can used in all weather conditions in India.

LIMITATIONS, IF ANY

- Skilled manpower is required.

MARKET LINKAGES

- Raw Material for Bapro plastering Machine is available with number of renowned ready-mix manufacturing brands in India.

MAJOR PROJECTS

- Machine and technology are used throughout the world
- Indira Gandhi International Airport (IGIA), New Delhi terminal 1 by L&T.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- EU Certified



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

CONCRETE CORROSION INHIBITOR ADMIXTURE

Construction chemical for preventing corrosion of steel reinforcement in concrete.



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

The agency, as a licensee of CSIR-CECRI, has come up with a patented Concrete Corrosion Inhibitor Admixture for preventing corrosion in reinforced concrete. The Central Electrochemical Research Institute, Karaikudi (CECRI), Tamil Nadu is one of the leading R&D Institutes under the Ministry of Science & Technology, Govt. of India.

The product just like other admixtures, can be directly added into wet concrete at the batching plants with batch water. It can also be added to the transit mixture at the site, and mixed along with batch water at the time of discharge. The dosage is 200 ml per bag of cement for Mild & Moderate environment and 250 ml per bag of Cement for High Chloride environment.



SALIENT FEATURES

- It is User & Eco-friendly, Non-toxic
- Creates adherent, thin protective film on metal surface.
- Suitable for high chloride environments. Increase resistance of natural passivating film on the metal surface to be broken down by chloride.
- Inhibitor maintains high alkaline environment & controls corrosion due to carbon dioxide.
- Improves the durability of reinforced concrete structure.
- It is an alternate to Rebar Coatings

ECONOMIC ASPECTS

- It is economical in use.



MS Tank required for Coating



Reinforcement Bar after Coating lying at yard

SUSTAINABILITY ASPECTS

- The corrosion of steel reinforcement, is one of the most significant durability issues of the concrete structure, which leads to rust formation, cracking, spalling, delamination and degradation of structures. This is considered to be the main factor causing damage in bridges, commercial buildings, flyovers, residential buildings and other infrastructures. The product provides additional safety against corrosion of steel, and improves the durability & service life of the structure.

SUITABILITY & AVAILABILITY

- It is suitable for all structures like residential and commercial buildings, bridges, airports, flyovers, dams etc built in mild, moderate, marine and high chloride environment conditions.
- The product is available in 5 Ltr, 10 Ltr, 20 Ltr, 50 Ltr and 200 Ltr packing.

LIMITATIONS, IF ANY

- It is essential that Cleanflo Steelcare be made part of the trial mix along with desired admixture.
- Self-life of the product is 18 months from the date of manufacturing in sealed condition, the container is to be kept closed when not in use and away from direct heat and sunlight.
- The dosage needs to be used as per manufacturer's specification/ environment conditions



Coated bar in use



Coated bar in use



Bars after treatment

MARKET LINKAGES

- It can be supplied pan India.

MAJOR PROJECTS

- Various Indian Railways & Metro Projects
- Delhi Development Authority (DDA), Delhi
- PWDs & NHAI

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- IS: 9077-1979,
- PATENT NO -109784/67
- Enlisted in Telangana & Andhra Pradesh Building SOR 16-17,17-18,18-19



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

WATER SAVING SANITARY FITTINGS & FIXTURES

Alternate to conventional sanitary fittings & fixtures



Scan QR Code for
Video

CONTACT DETAILS

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Mob: 7696399999



BRIEF

The products include many water saving innovative products such as self closing flush cocks, auto shut taps, sensor taps & recently Hygienic Foot Operated Valves. The foot operated valves delivers water by pressing the foot pedal, thus avoiding the chances of cross infections, as there is no need to touch the tap by hand. These products are suitable for Domestic, Commercial and Industrial use.

The Agency is enterprising international player in the Faucet and Bath industry since the year 1989 with presently 4 Integrated production units, with capacity of 5000 units per day & 320+ strong skilled work force.



SALIENT FEATURES

- Self Closing Flush Valve, which delivers preset quantity of water and stops automatically. Dual flush mode (half and full flush) are available for saving water.
- The foot-operated valves got many installations during Covid-19 pandemic.
- High Flow Products (Range of Products for Buildings with low Pressure Head)
- Has Sustainable Products, which are made with Recycled Brass
- Theft Resistant Taps for Public Places. It requires special tools, if it is to be removed from the wall (tools available in the original packing)
- High order of quality assurance, with advanced testing facilities (Life span test for spindle assembly, salt spray test etc.)
- Hold Multiple Design and Utility Patents.

ECONOMIC ASPECTS

- Saves water
- Theft resistant
- Low maintenance requirements
- The products using brass have economic advantages, as Brass has the capacity to be recycled an infinite number of times



SUSTAINABILITY ASPECT

- Helps conservation of water through reduction of wastage.
- Products made with Recycled Brass have significant environmental advantages, as Brass can be recycled an infinite number of times. Further, the recycling process for brass is less energy-intensive as compared to aluminium and steel and yields a smaller carbon footprint.

SUITABILITY AND AVAILABILITY

- The products are suitable for Plumbing purpose
- National and international reach and a wide spread Network of Dealers and Distributors all over India, Nepal, Bhutan and Sri Lanka.

LIMITATIONS (IF ANY)

- The fixtures need to be installed properly & as per the manufacturer's guideline

MARKET LINKAGES

- Available pan India & in neighboring Countries



MAJOR PROJECTS

- Commercial & Industrial Complexes, Educational Institutions, Hospitals, Married Accommodation Projects of Army (MAP),
- Group-Housing Societies, Corporations, I.T. Parks,
- State Tourism & Public Health Departments,
- State Housing Boards & M.E.S etc.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Certified by BIS (ISI)- IS 8931-1993
- Quality Management System-ISO 9001-2015
- Awarded the Indian Design Mark in 2021. India Design mark is a design standard which recognizes good design. The mark is awarded after evaluating good design through a systemized process by a Jury of National Institute of Design, Govt. of India, Ahmedabad



CATEGORY

BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

ECO-FRIENDLY CONSTRUCTION RELATED PRODUCTS- CEMENT BASED PLASTER MORTAR

Alternate to conventional plaster/mortar



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Organo Technologies Pvt. Ltd. is a MSME startup organisation responsible for manufacturing & promotion of new generation eco-friendly, economical and higher durability construction related products. It has developed ready to use cement-based plaster-mortar with premixed graded sand and high quality polymer modifications, which can be used for plastering applications. This is a patented product with a brand name Organo Ready to Use Plaster/Mortar & Maintenance Plast.

The product is suited for interior & exterior walls, roofing, masonry work and plastering of seepage-affected areas. It is also suitable for plastering applications in basements, ceilings, warehouses, tunnels, swimming pools, etc.

SALIENT FEATURES

- Ready to use (available in pre-mixed form & only water to be added)
- Organo Ready-Mix Plaster-Mortar/Maintenance Plast can be used for plastering on all types of bricks/block walls, AAC blocks, RCC and other concrete surfaces.
- High compressive strength
- Crack resistant, minimal wastage, damp & water proof
- Smooth surface finish with faster setting time
- Save 50% of labour cost
- Superior bond than conventional cement based mortar (plaster)
- Self-curing (70% less need of water curing after plastering)
- Plaster may be applied in a single stroke, even with high thickness (10mm-50mm)
- 30% more coverage area as compared to conventional plaster
- Saves time (putty & paint may be applied after 48 hours of application)
- Also, as per report of IIT Kanpur compressive strength of Organo Plast is much higher (20 MPa) than Traditional Plaster.





ECONOMIC ASPECTS

- Cost effective product, to achieve similar quality, the cost of Traditional plaster is found more than double of Organo Plaster.

SUSTAINABILITY ASPECTS

- The sustainability features of the product include; very less quantity of water used for curing, less pollution as comes in a dry pre-mixed form, strong & durable product giving a higher service life with low maintenance requirement.

SUITABILITY AND AVAILABILITY

Suitable for all kind of building/house-hold plastering & maintenance work

LIMITATIONS, IF ANY

- The surface should be structurally sound, clean and made free from oil, dirt, dust & laitance, grease, bond inhibiting agents, concrete sealers or curing compounds.

MARKET LINKAGES

- Based in Lucknow, however the partnership/ tie-ups for supply of product is being worked out on pan India basis.

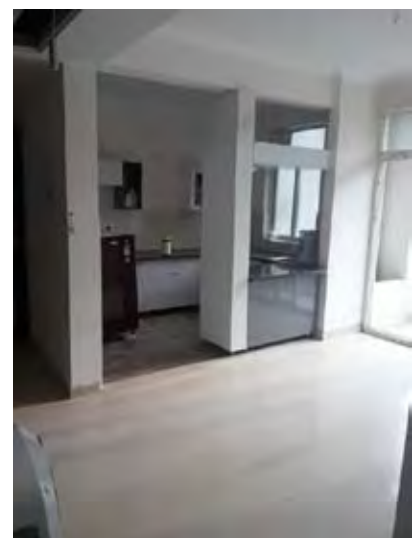
MAJOR PROJECTS

Products used by:

- Research Designs and Standards Organisation (RDSO), Ministry of Railways, Lucknow
- UP PWD,
- Uttar Pradesh Metro Rail Corporation Ltd (LMRC), etc.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Conforms to IS: 2250; IS: 4031 Standards, as Tested by IIT Kanpur
- Recommended/approved by UP Metro Rail Corporation for product empanelment
- Recommended for Schedule of Rates (SOR) by Uttar Pradesh Public Works Department (UPPWD) & Uttar Pradesh Rajkiya Nirman Nigam (UPRNN)



CATEGORY BUILDING MATERIALS/COMPONENTS



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

POLYNORM DOOR FRAMES & SHUTTERS

Alternative to conventional wooden Flush/Panel Doors



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

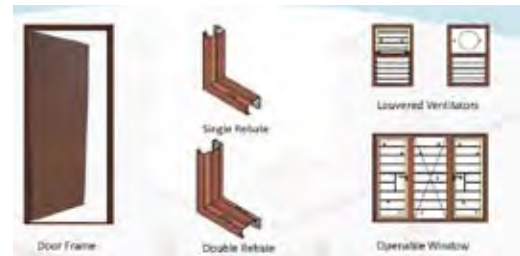
M/s B.G. Shirke Construction Technology Pvt. Ltd. Polynorm Door unit manufactures pressed steel door frames in collaboration with N.V. Nederlands Metall Industries Polynorm of Holland, a world leader in this field of pressed steel doors.

The steel flush door shutters, fire resistant doors, and safety doors have been developed after extensive research and continuous development.



SALIENT FEATURES

- Strong, Sturdy and long lasting.
- Non-corrosive, Termite free, No warping
- Aesthetical treatment& Maintenance free
- Non-hazardous & eco-friendly.
- Quality & durability.Long life - more than 20 years.
- Ease of Working – Door frames supplied in knock down condition and can be assembled at site by unskilled labour easily. Door shutters are transported and installed at site.
- Speed in construction – Doors are easily installed at site, Pre-fabricated to customised dimension & ready to install.
- Advantage over conventional material/ processes –
 - o Better quality,
 - o Longer life,
 - o Maintenance free,
 - o No warping, termite proof.
 - o Generates local employment,
 - o Sustainable,
 - o Light weight,
 - o Fire resistant.



POLYNORM DIVISION PRODUCTION SET UP



CNC- Press Brake



Vaccum Pickup



Honeycomb Paper
Expander & Dryer



Energy saving projection
welding machine



Pre treatment system with
PLC based transporter



CNC Turret
Punch Press



Automatic
Powder Spraying System



LPG Fired Conveyrised
Curing Oven



Plant Inside View

ECONOMIC ASPECTS

- As products are factory produced under strict quality control 100% interchangeability can be achieved due to dimensional control.
- Required minimum skilled/unskilled workers because of advanced technology of manufacturing is used. The assembly of door frames can be easily done by women labour also.

SUSTAINABILITY ASPECTS

- As an alternative to wood, steel is used in the manufacturing of these doors which eliminates cutting of trees and makes it a sustainable product.

SUITABILITY & AVAILABILITY

- The product is suitable for all type of housing, right from individual / scattered and low to high rise buildings.
- The door systems can be customised to variety of requirement.
- The doors are suitable for all climatic, and geographic regions.

LIMITATIONS, IF ANY

- As per Manufacturer's Specification.



MARKET LINKAGES

- The product is available for its use in all parts of our country.

MAJOR PROJECTS

- Various Residential, Commercial, Hospital, Airports, Malls and Educational Institutes.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

The product conforms to -

- IS 4351 – Steel door Frames - Specification
- IS 16074 – Steel flush door shutters - Specification
- IS 3614 (Part II) – Metallic & Non-Metallic Fire check Doors – Resistance Test and Performance Criteria

Testing done:

- ARAI Pune – 2 hrs. fire resistance test
- CBRI Roorkee – 2 hrs. fire resistance test
- College of Engineering, Pune – 1000 hrs. salt spray corrosion test
- Centre for Testing and Evaluation of Wood Composites, Bangalore – Steel flush door shutter tests as per IS: 4020.





**GLOBAL
HOUSING
TECHNOLOGY
CHALLENGE** INDIA

Indian Housing Technology Mela (IHTM)

D. Technology Shortlisted under GHTC-India

D1. Proven Technology Category

CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

LIGHT GAUGE STEEL FRAME STRUCTURE WITH INFILL CONCRETE PANELS

*Alternate to conventional RCC framed structure with
bricks/blocks as infill walling material*



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Light Gauge Steel Framed Structures (LGSF) is based on factory made galvanized light gauge steel components. The components/sections are produced by cold forming method and assembled as panels at site forming structural steel framework of a building of varying sizes of wall and floor. The assembly is done using special types of screws and bolts.

The Light Gauge Steel frames consist of high yield strength (550 MPa) roll formed GI 'C' cross sections of 63 mm to 150 mm with built-in notch, dimpling, slots, service holes etc. produced by computerized roll forming machines. The frames are clad with Precast concrete panel on both side and in-filled with light weight concrete of density 700kg/cum. Other options for wall cladding include cement fibre board, MGO board etc. with insulation material in the core.

The flooring / slab can be with deck sheet supported on floor joists with in-situ reinforced concrete on the top or in-situ conventional RCC slab. Wall cladding used (high density cement fibre board, concrete panels etc.) shall resist the wind load & conform to the functional requirements.

The sequence of construction comprises of foundation laying, fixing of tracks, fixing of wall panels with bracings as required, fixing of floor panels, fixing of roof panels, decking sheet, fixing of electrical & plumbing services and finally fixing of insulation material & walling panels.



SALIENT FEATURES

- High strength to weight ratio. Due to light weight, significant reduction in design earthquake forces is achieved
- Fully integrated computerized system with Centrally Numerical Control (CNC) machine primarily employed for manufacturing of LGSF sections provide very high Precision & accuracy upto 1 mm
- The speed of construction is very high
- Structure being light, does not require heavy foundation
- Structural element can be transported any place including hilly areas to remote places easily and structure can be erected fast
- Structure can be shifted from one location to other without wastage of materials
- Steel used can be recycled multiple times
- Thermal efficiency of the building can be designed as per the requirement

ECONOMIC ASPECTS

- Light weight construction with reduced size of foundation & overall economical construction
- Reduces construction time significantly
- Do not require skilled manpower.





SUSTAINABILITY ASPECT

- Primarily employs dry wall construction, thus reducing water usage
- Steel can be recycled multiple times
- High thermal efficiency can be achieved resulting in reduced cooling load

SUITABILITY & AVAILABILITY

- Due to Good Insulation property it is suitable for all zones. Structures can be designed as per local climate and geographical requirements.
- Available at all places. Can be assembled easily at site

LIMITATIONS, IF ANY

- For buildings higher than G+3, it can be used with hot rolled Steel sections.
- The labors are required to be trained for fabrication/assembly works
- Plumbing & electrical services need to be pre-planned



MARKET LINKAGES

- Pan India Availability

MAJOR PROJECTS

- Police constable Quarter (G+1) for Karnataka State Police Housing Cor. Ltd.
- Construction of Field Hostel at Chhabra Super Critical Thermal Power Project, Chhabra for Rajasthan Rajya Vidyut Utpadan Nigam Ltd.
- SC/ST Hostel for Institute of Advance Study in Science & technology, Guwahati

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Recommended technology under GHTC- India
- Covered under CPWD Schedule of Rates (SoR)



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

STAY-IN-PLACE INSULATED CONCRETE FORM WORK

Alternative to conventional bricks/blocks masonry wall



Scan QR Code for
Video

CONTACT DETAILS

M/s Reliable Building Solutions

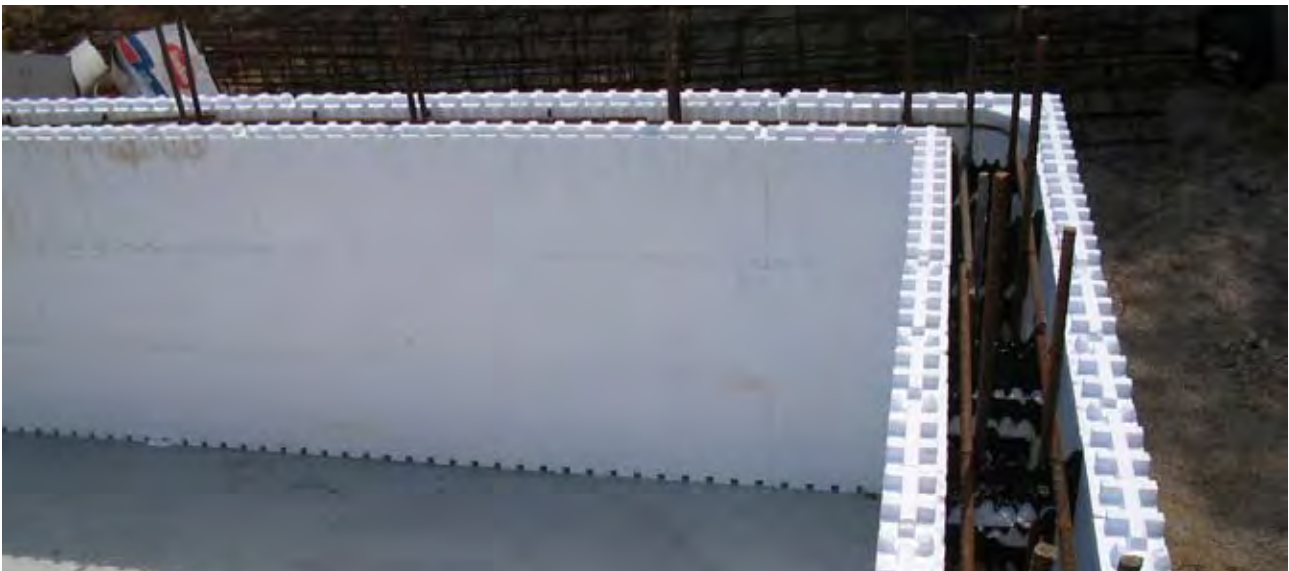
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E-mails: mmroy@reliableinsupacks.com
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BRIEF

Insulating concrete Forms (ICF) System comprises of a panel of two walls of Expandable Polystyrene (EPS) separated by a nominal distance of 150mm by hard plastic ties. These are assembled on site to hold reinforced concrete. The forms are open ended hollow polystyrene blocks which fit tightly together to form a shuttering system. Concrete poured into the hollow space to form a continuous wall. When cured, this wall supports the structural loads from floors and roofs, and the shuttering provides thermal insulation. Reinforcing steel shall be as required from design.

Upper and lower surfaces of the polystyrene panels are castellated and the vertical mating surfaces are tongue-and-groove to form a tight fit when joined together. The rigid formwork does not require supporting formwork. The inner surfaces have tapered grooves running vertically and have offset on opposite faces to ensure uniform concrete thickness. They also form locks for end stops. The outer surfaces are grooved vertically at 50mm centres to aid cutting and trimming.



SALIENT FEATURES

- The construction cost is similar to conventional buildings with framed structure of negligible thermal insulation.
- No water is used at site as concrete curing is due to adiabatic process (both side covered).
- Disaster proof structures due to monolithic concrete with joint free 3-D Box construction.
- Green concrete with higher recycled content & fly ash can be used as walls have zero thermal stress.
- High energy efficiency due to insulation layers saves up to 80% of HVAC costs, low maintenance & operational costs. Good acoustics insulation.
- Light weight, interlocking and hollow panels make the forms easy to transport, handle & assemble.

ECONOMIC ASPECTS

- Saves up to 80% of HVAC costs, low maintenance & operational costs.
- Per sq.ft civil construction rate is similar to conventional buildings with framed structure of negligible thermal insulation
- Light weight, interlocking and hollow panels make the forms easy to transport, handle & assemble.
- Least wastage & debris generated due to modular formwork which is easy to cut to match any wall dimensions.
- Smooth straight surface is easy to render and clad.
- No heavy or expensive machines required for installation.
- Significantly faster construction with lesser manpower.
- Needs no columns or beams for span <20m
- Sound insulation at no extra cost.



SUSTAINABILITY ASPECT

- No water used at site as RMC curing is due to adiabatic process.
- Green concrete with higher recycled content & fly ash can be used.
- Thermal Values R-19(SI 3.35) thermal resistivity for high Energy efficiency, air-tightness and acoustic insulation.

SUITABILITY AND AVAILABILITY:

- Ideally suited for all weather conditions.
- Both EPS and concrete are manufactured all over the country.
- Will require >300mm width for formwork with 200mm concrete wall thickness for high rise buildings > 12 floors.
- ideal for all types of low rise houses, due to ease of availability, low transport costs, easy to assemble with semi-skilled manpower
- All weather conditions, particularly remote locations or with harsh climate, natural hazards prone areas.

LIMITATIONS, IF ANY

- Door and windows position cannot be changed after pouring of concrete.
- Forms are not reusable as compared to conventional materials.
- Will require >300mm width for formwork with 200mm concrete wall thickness for high rise buildings > 12 floors.





MARKET LINKAGES

- As both EPS and concrete are manufactured all over the country as part of the MSME industry

MAJOR PROJECTS

- Commercial Building- 4 storeys, Indore (MP)
- Multifamily housing – basement, stilt +3 floors, New Delhi
- Industrial Warehouse -Basement + Ground Floor, Gr. Noida (UP)
- Office Building -G+1, Gr. Noida (UP)
- Villa - 2 floors, 60 km above Shimla (HP)
- Farmhouse – 2 floors, Khammam, Telangana
- Sports Hostel – 4 floors, Bhopal (MP)

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Certified by BMTPC under PACS



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

STRUCTURAL STAY-IN PLACE FORMWORK SYSTEM

Alternative to conventional bricks/blocks masonry wall



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

It is a patented structural stay in place formwork system known as 'Coffor' to build load bearing monolithic concrete wall structures based on shear wall concept. The formwork system comprises of two filtering grids made of rib mesh reinforced by 'C' channel vertical stiffeners. The grids are connected by rebar which act as horizontal stiffeners and connector which act as a shear link.

The grids on both faces act as sacrificial formwork in which concrete is poured in-situ. After the erection of formwork panels in alignment, corners, edges of doors and windows frame are closed with rebar positioning & concrete of required grade is poured in the panels. The concreting may be done with a pump, bucket or with a shovel loader. The inside and outside walls are finished with cement plaster of suitable grade.

The formwork system comprises of two filtering grids made of rib mesh reinforced by vertical stiffeners called 'C' channel. The grids are connected by rebar which act as horizontal stiffeners and connector which act as a shear link. The grids on both faces act as sacrificial formwork in which concrete is poured in-situ. The vertical steel channels and horizontal steel bars act as steel reinforcement for load bearing wall. The connectors help to fold the formwork for easy transportation.

The panels are prefabricated which when arrive on the constructions site are installed and ready for concreting. The panels are prefabricated according to a structural plan (based on client's architectural plans) designed by structural engineers. Coffor India supplies four types of panels.

- Standard Double panel- to build internal and external wall
- Standard Single panel- for slab shuttering, or as shuttering for RCC wall having thickness more than 350mm
- Fibre Cement Double panel- to build walls and infrastructure projects
- Insulated double panel – to build external walls for hot climatic conditions.



SALIENT FEATURES

- Speedy construction.
- Reduced number of skilled labour required.
- Eliminate shuttering and de-shuttering.
- Earthquake resistant structures.
- Reduce transportation cost.
- No Heavy Machinery Required.
- Cost saving in Reinforcement.
- No repetition required.
- Easy insertion of electrical and plumbing, no need to cut the walls except electrical boxes.
- Improve Concrete Quality.
- Reduce maintenance Cost.

ECONOMIC ASPECTS

- Reduction of site overhead expenses.
- Absence of shuttering & minimal reinforcement requires less cash flow.
- Less man power required. Can be erected with unskilled labour.
- Reduced material wastage and construction debris hence economical.
- Reduction in Maintenance cost.
- No need of heavy machinery.
- Required minimal reinforcement, reduces amount of steel required and its wastage.
- Eliminates de-shuttering activities, as Coffor panels remain in the structure and part of the structure.





SUSTAINABILITY ASPECT

- Scrap generation is very less,
- No hazardous chemical used, no high temperature process involved.
- As Coffor panel consume less volume compare to brick during transportation it saves energy utilization in transportation in form of fuel burn and reduces carbon foot print.
- Heavy machinery, which consume energy and generates high temperature is not required.
- Wood consumption is very minimal and possible to use recycle scaffolding materials.
- Coffor insulated panels provides good thermal insulation.
- Factory made products reduces concrete wastage

SUITABILITY AND AVAILABILITY

- Suitable for all geo-climatic condition.
- Available PAN India.
- It can be used to build all types of RCC structures including load bearing walls and retaining walls.
- Storm water drain - speed of construction at the rate of 100 Rmtr /Day.
- Compound wall - speed of construction at the rate of 100 Rmtr /Day.
- All type of water retaining structures.

LIMITATIONS, IF ANY

- Door and windows position cannot be changed after pouring of concrete.
- Forms are not reusable as compared to conventional materials.





MARKET LINKAGES

- As both Coffor panel and concrete are manufactured all over the country.

MAJOR PROJECTS

- G+3 Building at Telangana (Client –BMTPC)
- G+2 Building at Bihar Sharif (Client– BMTPC)
- Demonstration Housing Project (DHP), Agartala. (BMTPC) (under construction) G+1 Structure.
- Construction of Bunker at Northeast , Military Engineering Services (MES)

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Certified by IIT Mumbai
- Certified by BMTPC under PACS
- Military Engineering Services (MES)
- CSTB, France



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



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Technology Detail

QUIK BUILD – 3D EPS CORE PANEL SYSTEM

Alternative to conventional bricks/blocks masonry wall



Scan QR Code for
Video

CONTACT DETAILS

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BEARDELL LIMITED

BRIEF

QuikBuild Construction System is a premium product that uses prefabricated panels consisting of super insulated core of expanded polystyrene sandwiched between two custom engineered sheets of special rust-protected steel welded mesh to create a strong shell for the building. The wall panel receives its strength and rigidity from the diagonal cross wires welded to the welded-wire fabric on each side. This combination produces a truss behaviour, which provides rigidity and shear terms for a full composite behaviour. These panels are used in the construction of exterior and interior load bearing and non-load bearing walls and floors of buildings of all types Construction.

A special mix of concrete is then applied using traditional method or a shot-creting machine to create a monolithic structure. QuikBuild brings the strength of steel in to your walls while providing space saving, lower air conditioning cost etc. Our products help you achieve the Green Certification for your building.

The complete structure is reinforced with 2-3 mm (zinc quotted steel wire mesh specially designed such that up to G+2 structure there is no need of beams & columns and even Lintel are not required in the QuikBuild





SALIENT FEATURES

- There is no need of beams & columns and even Lintel are not required in the QuikBuild system.
- Light weight, easy to handle and assemble,
- Fast in Installation with saving in time (50 % of time vs conventional construction)
- Panel's biggest advantage is that reduces material and labour cost (10 % saving).
- Insulated and sound proof.
- Fire resistant (Fire rating up to 2 hours).
- Passed bullet penetration test for 6in wall tested at CRPF Avadi.
- Are designed for flexibility making any kind of geometrical form.
- Earthquake, cyclone and weather resistant.
- Termite proof.
- Panels work is completed with smooth finish. Overall cost of construction 10-15% less as compare to conventional construction.
- The Quikbuild structure can be designed to withstand wind loads of up to 400KM/hour

ECONOMIC ASPECTS

- Fast in Installation with saving in time (50 % of time vs conventional construction).
- Panel's biggest advantage is that reduces material and labour cost (10 % saving).
- 10% more carpet area. Very effective and huge savings in metro cities.
- 10-15% cheaper than conventional construction.



SUSTAINABILITY ASPECT

- Structure will be thermally insulated and reduces consumption of energy (30- 40% saving).

SUITABILITY AND AVAILABILITY

- Suitable to all climatic conditions.
- At present manufacturing plant for this Technology is available in South, West and North India. Company is planning to set-up a plant in East India in near future.
- Compatible with any kind of technology.

LIMITATIONS, IF ANY

- As per Manufacturer's Specification

MARKET LINKAGES

- Available Pan India





BEARDSSELL LIMITED

MAJOR PROJECTS

- Jeevodaya Hospital, Chennai
- PMSSY, Jhansi Medical
- PMSSY, Odisha Medical
- Govt. Hospital Karnataka Mortuary
- CPWD-IIT jammu
- Odisha Railway Qtr.
- Rohini Govt. School
- Hotel, Kodaikannal
- Old Age Homes, Coimbatore
- Anganwadi Paderu taluk Vizag Dist.
- Northern Railway – G+1 S&T Building at Varanasi
- UHBVN Panchkula – G+7 External Wall
- HQ 4 Corps, 102 Regiment, Indian Army- Tezpur – OJL Shelter

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- QuikBuild is thoroughly tested and certified by various govt. Institutions for which we are pleased to provide necessary certifications.
- IIT (Madras).
- CISR- SERC Chennai
- BMTPC under PACS
- MSME Mumbai.
- Platinum rating award for QuikBuild Farmhouse given by Indian Green Building Council.



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

STAY-IN-PLACE PVC FORMWORK SYSTEM

Alternative to conventional bricks/blocks masonry wall



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Novel wall System consists of rigid poly-vinyl chloride (PVC) based polymer components that serve as a permanent stay-in-place durable finished form-work for concrete walls. The extruded components slide and interlock together to create continuous formwork with the two faces of the wall connected together by continuous web members forming hollow rectangular components. The web members are punched with oval-shaped cores to allow easy flow of the poured concrete between the components.

The hollow Novel Wall components are erected and filled with concrete, in situ, to provide a monolithic concrete wall with enhanced curing capacity due to water entrapment, as the polymer encasement does not allow the concrete to dry prematurely with only the top surface of the wall being exposed to potential drying. The polymer encasement provides crack control vertically and horizontally for the concrete, and provides vertical tension reinforcement thus increasing the structural strength of the wall.



The resulting system is unique and provides substantial advantages in terms of structural strength, durability enhancement, weather resistance, seismic resistance, design flexibility, and ease of construction. Steel dowels are necessary to anchor the wall to the concrete foundation.

Novel offers Pre-finished concrete wall solution, serving the residential, commercial, industrial and agricultural sectors. Unique Concrete Forming Technology in which Components interconnect together to create a finished concrete wall.



SALIENT FEATURES

- Avoids many trades such as mason, painter etc. therefore faster project execution by 20% time saving & 25% labour saving during superstructure construction.
- Plaster-Paint free reduces maintenance cost
- Design Flexibility, Pre-cut components for easy on site-assembly
- Durable, weather proof, clean & hygienic.
- Safe from termite's attack, peel, chip, stains, moulds, fungi, bacteria, insects, rodents.
- Coastal region application due to Waterproof joints
- 200mm Sections with insulation highly suitable for Himalayas extreme cold
- Fast and easy construction.
- No curing is required.
- Formwork is 100% Recyclable hence no generation of waste.
- Unskilled labours can be used for erection at site.
- Better fire resistance & thermal efficiency.

ECONOMIC ASPECTS

- Faster execution by 20% time saving in construction & 25% labour saving during superstructure construction.
- Plaster-Paint free reduces maintenance cost.





SUSTAINABILITY ASPECT

- Contributes to LEED credits and government rebates
- 55-75% recycled content pre-consumer and post- industrial Shear Walls are manufactured using 'R3' extrusion technology as an environmentally friendly product.
- The polymer components contain over 55% recycled content and are recyclable, energy efficient, mould and mildew resistant and non-toxic.
- Energy efficient building envelopes.
- Low life-cycle costs - Product is recyclable.
- There is zero waste while manufacturing Novel Walls as all the manufacturing waste is recycled.

SUITABILITY AND AVAILABILITY

- The polymer components do not decay or deteriorate over a lifespan.
- 200mm Sections with insulation highly suitable for Himalayas extreme cold.
- Novel has over 100,000 Sq. Ft of Manufacturing Facilities in India
- Suitable to all Climatic conditions.
- Availability across the country.

LIMITATIONS, IF ANY

- Erection of panels shall be under supervision of trained staff.
- Stay in Place PVC Forms Walls need pre-planned & installed MEP/Services for concealed network.
- Door-Window openings & MEP all needs to be pre-planned before execution.





MARKET LINKAGES

- Pan India Availability.
- Novel has over 100,000 Sq. Ft of Manufacturing Facilities in India.

MAJOR PROJECTS

- Factory, Silvassa
- Residential Structures at Silvassa
- NBCC, Port Blair
- Industrial Building, Toronto
- Penukonda, Andhra Pradesh
- Light House Project (LHP) at Lucknow (under construction)

CERTIFICATION/INDIAN STANDARDS/ENDORSEMENT

- Certified by BMTPC under PACS



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

BAUPANEL SYSTEM

Alternative to conventional bricks/blocks masonry wall



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Video

CONTACT DETAILS

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BRIEF

BAU panel system consists of panels of expanded polystyrene (EPS) and steel wire mesh which are applied with concrete at site. This system comprises of a layer of steel mesh on either side of EPS core welded together by steel trusses (orthogonal) which penetrate through EPS core. The panels are joined together in a configuration on site and sprayed on both sides with shotcrete to form a sandwich type construction.

The exterior of the panels shall be finished with weather proof coating or lined with conventional lining material while interior surfaces (walls) and ceilings shall be finished with water/ solvent based coating or lined with conventional lining material. The system is suitable for walls and floors of residential and commercial buildings.

The technology by the name BauPanel System was originally developed by BauPanel System S.L., Spain and BauPanel System India Pvt. Ltd. is a sister concern of the parent firm. The Certificate holder proposes to install the plant in India shortly for manufacture of the panels.

BauPanel can generally be used as load bearing walls and non-load bearing walls, partition walls and floor/ roof slabs in residential and commercial building.



SALIENT FEATURES

- The system provides significant improvements in indoor thermal comfort by greatly reducing energy consumption.
- The panel has good acoustic behaviour, coupling with sound-absorbing materials.
- The expanded foam polystyrene used for panels is self-extinguishing.
- The building system gives full design flexibility as it offers a complete range of building elements such as loadbearing walls, curtain walls, floors and stairs.

ECONOMIC ASPECTS

- Fast and easy construction.
- Panels are both easy to handle and transport.
- Unskilled labours can be used for erection at site.
- It is cheaper than ordinary burnt Clay bricks and concrete blocks.



SUSTAINABILITY ASPECT

- The system provides significant improvements in indoor thermal comfort by greatly reducing energy consumption.
- No fire is required to produce bricks. Embodied energy is significantly less than ordinary burnt clay bricks.
- Carbon emissions are significantly less than ordinary burnt clay bricks.

SUITABILITY AND AVAILABILITY

- Sold by Auroville PAN India anywhere.
- Suitable for all climate conditions.
- Door-Window openings & MEP all needs to be pre-planned before execution.
- BauPanel System should be constructed only with technical support or supervision by qualified engineers.





LIMITATIONS, IF ANY

- Panels shall have to be sealed properly.
- Not all soil can be used for CSEB. It is required to conduct testing of soil.

MARKET LINKAGES

- Sold by Auroville Pan India.

MAJOR PROJECTS

- 2,698 earthquake resistant houses, after the 2001 Bhuj earthquake have been constructed using CSEB.
- Auroville Kindergarten, Solar kitchen Prarthna apartments, Tibetan pavilion, etc.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Certified by BMTPC under PACS
- Gujarat State Disaster Management Authority (GSDMA) adopted CSEB for the rehabilitation of the regions affected by the January 2001 Gujarat earthquake in Kutch district
- Government of Iran (Housing Foundation) adopted CSEB for the rehabilitation of the regions affected by the December 2003 earthquake in Bam.



CATEGORY

PROVEN TECHNOLOGY CATEGORY



PRODUCT / TECHNOLOGY



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Technology Detail

PRECAST CONCRETE CONSTRUCTION SYSTEM – PRECAST COMPONENTS ASSEMBLED AT SITE

*Alternate to conventional RCC framed structure with
bricks/blocks as infill walling material*



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Video

CONTACT DETAILS

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SHIRKE

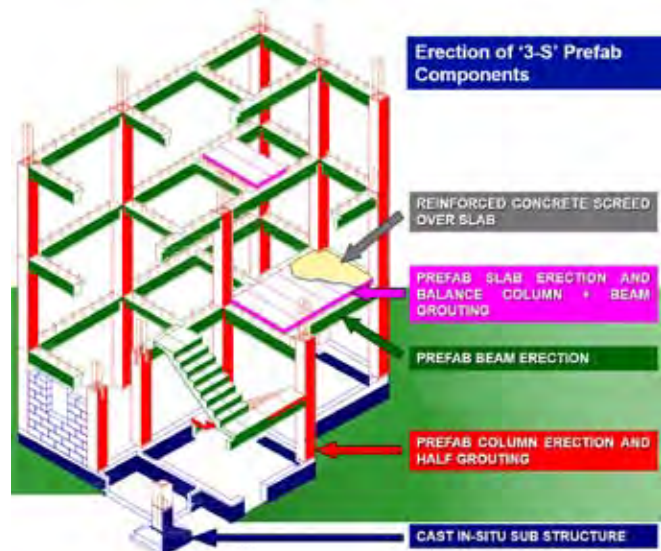
BRIEF

'3-S' Prefab Technology/ Pre-cast Concrete Structural system comprising of pre-cast column, beam, precast concrete / light weight slab, AAC blocks/ infill concrete walls. Structural members are cast in the factory and assembled at site.

3S system incorporates precast dense reinforced cement concrete hollow core columns, structural RCC shear walls (as per design demand), T/L/Rectangular shaped beams, stairs, floor/roof solid Precast RCC slabs, lintels, parapets and chajjas. AAC blocks are used for partition walls. Hollow core columns are erected above substructure, over which beams are integrated in the column notches followed by erection of slabs.

3S Prefab Technology completely eliminates the use of timber and forest produce of any category. On the contrary, use of fly ash and GGBS enhances the sustainability. The thermal and acoustic insulation provided by the AAC block masonry, facilitates reduction in energy towards maintaining comfort level temperature within enclosed habitat space. Also, considerable reduction in dead load is achieved due to use of form finish precast components & AAC material resulting into better performance under seismic loads.

All the structural components are pre-engineered and manufactured in factories / site factories with objective quality control resulting into dimensional accuracy, correctness in spacing of reinforcement, uniform protective cover, full maturity of components and assurance on design strength due to use of design mix concrete having minimal water-cement ratio which ultimately results into durable structure. Plants & Machineries for production of Components available in Pune, Mumbai, Bangalore and Delhi. These can be setup at / nearby project site within very short time.



SALIENT FEATURES

- Precast construction use causes reduction in construction time.
- The controlled factory environment brings resource optimization, and improved quality, precision & finish.
- Reusing factory waste as fly ash, etc., conserves natural resources.
- Increased safety on site
- Reduced wastage.
- Decreasing dependency on skilled labours
- Increasing numbers of parallel activities
- Minimizing air, water and noise pollution at work site
- Very minimal requirement of water for construction
- Non-generation of construction debris
- Elimination of use of timber / wooden scaffolding/ Shuttering.
- All weather site execution
- Cost saving due to compressed completion time and rental cost reduction
- Sync with the objectives of 'Swatch Bharat Mission'
- Skill up-gradation of workers



ECONOMIC ASPECTS

- Reduced uses of scaffolding and shuttering.
- Cost effective due to reduced completion time and rental cost reduction.
- Less skilled manpower required.



SUSTAINABILITY ASPECT

- Reduces wastages considerably owing to better quality / process controls and repetitive task.
- Reuse of industrial wastes such as fly ash.
- Less use of water.
- Reduced environmental pollution.
- Reduces use of forest products.

SUITABILITY AND AVAILABILITY

- Due to centralized precast facility, storage of raw materials and requirement of concrete is mainly at one place.
- This ensures better controls on material management.
- Suitable in all weather conditions for mass housing.
- Tested for earthquake resistance for seismic Zone-IV. Not ready for Seismic zone –V.
- Turnkey projects only anywhere in the country

LIMITATIONS (IF ANY)

- Huge project size is required (at least a 1000 DU) since for construction production facilities are to be set up at site.



DEMONSTRATION HOUSING PROJECTS (DHPs) under PMAY(U)

BIHARSHARIFF, BIHAR



PROJECT PROFILE

- Number of Houses 36 (G+2)
- Usage: Sports Hostel & other social welfare activities
- Technology: Structural Stay-in-Place Steel Formwork System (Coffor)

LUCKNOW, UTTAR PRADESH



PROJECT PROFILE

- No. of houses : 40 (G+1)
- Usage: Rental basis to Hospital patients & their attendees
- Technology: Stay in Place EPS based Double Walled Panel System (SISMO)

DHPs under PMAY(U) : 256 demonstration houses constructed

DEMONSTRATION HOUSING PROJECTS (DHPs) under PMAY(U)

AGARTALA, TRIPURA



PROJECT PROFILE

- No. of houses : 40 (G+1)
- Usage: Shelter for Destitute Women
- Technology: Structural Stay In Place Steel Formwork System

AHMEDABAD, GUJARAT



PROJECT PROFILE

- No. of houses : 40 Nos. (G+2)
- Usage: PMAY(U) Beneficiaries
- Technology: Precast construction System - Integrated Hybrid Solution-One

DHPs under PMAY(U) : 228 demonstration houses under construction

MARKET LINKAGES

- Plants & Machineries for production of Components available in Pune, Mumbai, Bangalore and Delhi.
- These can be setup at / nearby project site within very short time.

MAJOR PROJECTS

- Light House Project (LHP) at Chennai (under construction)
- Mahada, Marsova, Mumbai.
- Judicial Quarter, Bangalore.
- DDA housing in Delhi.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- ISO 9001-2015, ISO 14001 – 2015, ISO 45001-2018



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

LIGHT GAUGE STEEL FRAMING (LGSF) HYBRID WITH PRE-ENGINEERED STEEL BUILDING

Alternate to conventional RCC framed /load bearing structure



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Cold Formed Light Gauge Steel Frame (LGSF) Construction Technology has light gauge Steel frames hybrid with Pre-engineered Steel (as per design requirement) as structural member with various options of walling (Cement fibre board, concrete panels etc. with insulating material as core) & flooring (in-situ concrete on deck sheet etc.)



SALIENT FEATURES

- Dead Load of LGSF is around 40% of the conventional brick wall dead load which in turns saves cost of construction in foundation & overall weight of building
- More sustainable than conventional construction as minimum use of cement and natural resources like sand, water, aggregates etc. in the whole structure
- Almost nil wastage of material at site and in factory.
- Can be designed for any Thermal, Structural and Fire performance.
- Reduced labour requirement for erection work as the components are light in weight.
- Less consumption of electricity as well as fuels in the work of erection at site.
- Majority of components are pre-fabricated & light and hence reduction in the time of execution at site by more than 20-40 %.

ECONOMIC ASPECTS

- Less dead load of material reduces expenditure on heavy structure.
- Less manpower requirement.
- Reduced execution time.
- Reduced wastages at site and factory.



SUSTAINABILITY ASPECT

- Reduced power usage.
- Minimum usage of natural resources.

SUITABILITY AND AVAILABILITY

- Suitable for extreme temperatures from – 50°C to + 50°C and hence successfully used in 128 Countries all across the globe.

LIMITATIONS, IF ANY

- As the technology is fast track, cash flow maintenance becomes difficult, if payment milestones are as per conventional construction.

MARKET LINKAGES

- Products are available at Surat factory and can be transport across the Country.
- Other finishing materials are readily available pan India.



MAJOR PROJECTS

- Light House Project (LHP) at Agartala (under construction)
- 20 small housing projects at various locations in Kerala awarded by Kerala Life Mission.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Indian standard (IS)/ ASTM Codes are available for various components
- Design vetted by IITs/NITs etc.
- IS 801 -1975



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

PREFABRICATED FIBRE REINFORCED SYSTEM / SANDWICH PANELS

Alternative to conventional bricks/blocks masonry wall



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Aerocon panels are sandwich panels, made of two fibre reinforced cement facing sheets, on either sides of a lightweight concrete core. The core is made from a mix of Portland cement, binders and siliceous&micaceous material aggregate. These panels have a unique tongue and groove jointing system that facilitates rapid construction and are fully cured at the factory itself. These panels are of manufactured by using Flexo Board (FOB)/Fibre Cement Board (NT).



SALIENT FEATURES

- Cost effective.
- Superior thermal & acoustical insulation.
- Termite & mould resistant.
- Good fire resistance.
- Strong and durable.
- Multipurpose application.
- Faster Construction.
- Water Resistant.
- Buildings can be easily expanded in length and adding additional bays.

ECONOMIC ASPECTS

- Due to the System approach, there is a significant saving in design, manufacturing and on-site erection cost.
- More carpet area.
- Low maintenance cost.
- 5 times faster than Brickwork, thereby saving time & cost.
- Addition 3-5% carpet area.



SUSTAINABILITY ASPECT

- Reusable up to 80%.
- The product is green as core contains materials such as pulverized fly ash and light weight aggregate which make it light weight & environment friendly.
- Energy efficient with lower 'U' value.

SUITABILITY AND AVAILABILITY

- Suitable to all types of climate
- Available across the country.
- Can take any type of finishing.

LIMITATIONS, IF ANY

- The floor spans executed with movable forms shall not be more than 5.60 m.
- Suitable for single storey load bearing structure, as infill wall in Non-load bearing structures.



MARKET LINKAGES

- Available Pan India.

MAJOR PROJECTS

- Custom Cabins at Bhachau, Kutchh dist., Gujarat.
- Fysolate Pharma, Vizag
- Chatrapati Super Speciality Hospital at Mumbai.
- Fylfot Public School, Dehradun.
- Alpha International City, Karnal.
- Hostel block, Aligarh University.
- BM Birla Heart Research Centre, Kolkata
- Calcutta Medical Research Institute, Kolkata
- Birla Institute of Technology, Mesra, Ranchi
- Modern High School for Girls, Kolkata
- Rukmani Birla Modern High School, Jaipur.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Approved by BMTPC under PACS.



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

3D MODULAR PRECAST TECHNOLOGY: MAGICPOD

Alternate to conventional RCC framed /load bearing structure



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

3D Modular Precast/ Magic Pods using steel mould and high performance concrete of building modules in factory/ casting yard. These pods are transported to the construction site & assembled.

This 3D Volumetric concrete construction is the modern method of building by which solid precast concrete structural modules like room, toilet, kitchen, bathroom, stairs etc. & any combination of these are cast monolithically in Plant or Casting yard in a controlled condition. These Modules termed as MagicPod are transported, erected & installed using cranes and push-pull jacks and are integrated together in the form of complete building unit. Subject to the hoisting capacity, building of any height can be constructed using the technology.

Construction & installation process

Sequential construction in the project here begins with keeping the designed foundation of the building ready, while manufacturing of precast concrete structural modules are taking place at the factory. Factory finished building units/modules are then installed at the site with the help of tower cranes. Gable end walls are positioned to terminate the sides of building. Pre stressed slabs are then installed as flooring elements. Rebar mesh is finally placed for structural screed thereby connecting all the elements together. Consecutive floors are built in similar manner to complete the structure.

Advantages

- About 90% of the building work including finishing is complete in plant/casting yard leading to significant reduction in construction & occupancy time
- The controlled factory environment brings resource optimization, improved quality, precision & finish
- The required concrete can be designed using industrial by-products such as Fly Ash, Ground granulated blast furnace slag (GGBS), Micro silica etc. resulting in improved workability & durability, while also conserving natural resources. In this project Ground granulated blast furnace slag & silica fume is being used in concrete.
- With smooth surface it eliminates use of plaster
- The monolithic casting of walls & floor of a building module reduces the chances of leakage

- The system has minimal material wastage (saving in material cost), helps in keeping neat & clean construction site and dust free environment
- Use of Optimum quantity of water through recycling
- Use of shuttering & scaffolding materials is minimal
- All weather construction & better site organization

SALIENT FEATURES

- Upto 90% industrialization ensures savings in wastages in every raw material as it is manufactured in controlled environment with automated machines reducing errors.
- Reduction in manpower by 60%.
- Eliminates use of plaster
- 50% faster construction speed
- Seismic stability: Suitable up to Zone: 04
- Acoustic Performance: ≤ 45 dB
- High performance concrete of grade M - 40 and above



ECONOMIC ASPECTS

- Faster construction speed.
- Reduced wastages.
- Manpower reduction.

SUSTAINABILITY ASPECT

- Reduced use of water.
- Reduced necessity for plastering.

SUITABILITY AND AVAILABILITY

- Suited for all weather conditions.



LIMITATIONS (IF ANY)

- Heavy machinery required.
- Unsuitable for small scale projects.

MARKET LINKAGES

- Available Pan India.

MAJOR PROJECTS

- Light House Project (LHP)-Ranchi (under construction)
- Shell Retail outlets Pvt. Ltd.,
- SRF, KCIL, Panoliintermediates.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Recommended technology under GHTC



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

MODULAR TUNNEL FORMWORK SYSTEM

*Alternate to conventional RCC framed structure with
bricks/blocks as infill walling material*



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Tunnel formwork is customized engineering formwork replacing conventional steel/plywood shuttering system. It is a mechanized system for cellular structures. It is based on two half shells which are placed together to form a room or cell. Several cells make an apartment. With tunnel forms, walls and slab are cast in a single day.

Tunnel formwork is customized engineering formwork replacing conventional steel/plywood shuttering system. It is a mechanized system for cellular structures. It is based on two half shells which are placed together to form a room or cell. Several cells make an apartment. With tunnel forms, walls and slab are cast in a single day. The structure is divided into phases. Each phase consists of a section of the structure that will be cast in one day. The phasing is determined by the program and the amount of floor area that can be poured in one day. The formwork is set up for the day's pour in the morning. The reinforcement and services are positioned and concrete is poured in the afternoon. Once reinforcement is placed, concrete for walls and slabs shall be poured in one single operation. The formwork is stripped the early morning next day and positioned for the subsequent phases. The on-site implementation of 24 hour cycle is divided into following operations.

- Stripping of the formwork from the previous day.
- Positioning of the formwork for the current day's phase, with the installation of mechanical, electrical and plumbing services.
- Installation of reinforcement in the walls and slabs.
- Concreting and if necessary, the heating equipment.

This system has been designed and developed to ensure that it is simple and quick to assemble and position the following:

- A full range of standard dimensioned components
- Multiple combination of panels for simple adoption to specific configurations
- Basic standard equipment incorporates com-



- plete safety, circulation and stability equipment
- Calliper–device opposing Wall form packages are craned into position in one lift.

Characteristics of the system

- Maximum span between walls shall be 5.60 m without accessory units and 7.00 m with accessory units.
- Height of the formwork – The forms are designed for floor to ceiling height of 2.51 m minimum with the possibility to increase this by action of the leg jacks or with the use of movable panels in the event of extra heights.
- Appearances of the faces after form removal – The surfaces obtained allow direct application of finishing paint or wallpaper after sanding off the fins at the joints connecting the units and smoothing with paint filler.
- Working rhythm using the system – Under average temperature conditions, with the use of ordinary cement, the normal rhythm is two days per cycle with one day and two nights for drying and setting of the concrete.
- Time period required for execution of the process – The time required for execution shall vary according to the cell plan. For a type cell consisting of two formed wall surfaces and a floor surface, the average time is less than one & one half hours per square meter of building.
- Cost effectiveness: Highly cost effective due to repetition of formwork.(24 hours cycle)
- Resource efficiency.(saving of natural resources like sand, lime stone water)
- Quality &Durability.
- Environment friendliness including use of Agro-industrial wastes
- Ease of Working: can be operated very easily using mechanical means hence reduce manpower and speed up the construction work.
- Earthquake & Wind Resistant
- The equipment used each day is productive and is reused in subsequent phases.
- The existing equipment can be adapted on a day-to-day basis by the addition of standard elements and corner wall formwork to take into account different wall configurations on site.



ECONOMIC ASPECTS

- Highly cost effective.
- Reduced manpower and increased speed of construction.

SUSTAINABILITY ASPECT

- Reuse of Agro Industrial waste.

SUITABILITY AND AVAILABILITY

- Suitable all type of climate
- Suitable for individual/scattered and low to medium height houses.

LIMITATIONS, IF ANY

- The floor spans executed with movable forms shall not be more than 5.60 m, unless accessory units are used.
- The thickness of vertical in-situ walls shall not be more than 120 mm.
- Adequate working space is required to remove Tunnel formwork.
- Architectural design and planning should be suitable for Tunnel formwork.
- Unsuitable for small scale projects.



MARKET LINKAGES

- Available across nation.

MAJOR PROJECTS

- Light House Project at Rajkot (1144 nos.-under construction).
- Apartments by M/s Runwal Group at Mumbai
- Apartments by M/s L&T South City Projects Ltd., at Chennai.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- PAC by BMTPC.



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

PREFABRICATED SANDWICH PANEL SYSTEM

Alternate to conventional RCC framed /load bearing structure



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Rising EPS (Beads) Cement Panels are lightweight composite wall, floor and roof sandwich panels made of thin fibre-cement/calcium silicate board as face covered boards and the core material is EPS granule balls, adhesive, cement, sand, fly ash and other bonding materials in mortar form. The core material in slurry state is pushed under pressure into preset molds.

Once set, it shall be moved for curing and ready for use with RCC or steel support structure beams and pillars. These panels are primarily used as walling material but can also be used as floor and roof panels. These are non-load bearing panels to be used with structural support frame only.

Precast Hybrid Building System comprising of ready-to-install EPS Cement Panels for walling & Pre-Stressed Hollow Core slabs for roofing.





SALIENT FEATURES

- The panels being light weight, helps in easy installation, transportation & reduction in construction time.
- The EPS core has high thermal & acoustics efficiency, which can further be customized to deliver specific thermal insulation requirements.
- Buildings made using panels are lightweight but are at the same time rigid due to two sheets of reinforced plaster that interact to create an enveloping 'shell' of the whole structure. This aspect makes the building seismic & wind resistant.
- Building with any geometric shape/complex architectural drawings can be constructed.

ECONOMIC ASPECTS

- Cost saving in time and labour.
- Increase in carpet area upto 11%.





SUSTAINABILITY ASPECT

- Water saving due to dry construction.
- High compressive strength,
- Dry shrinkage.
- Environment friendly and non-toxic.

SUITABILITY AND AVAILABILITY

- Suitable for all kind of climate conditions.
- Two plants at Pune and Nagpur so far and third one is in the process so that the product can be available all over India.

LIMITATIONS, IF ANY

- These panels can be used load bearing walling up to G+1. For higher stories, panels can be used with additional structural support, steel or RCC depending on the design.
- Door-Window openings & MEP all needs to be pre-planned before execution.

MARKET LINKAGES

- Available Pan India.





MAJOR PROJECTS

- Light House Project, Indore (1024 flats) (under construction).
- Projects at various locations in the Country.
- Tower- 15 NBCC Apartments, New Kidwai Nagar, New Delhi.
- Hotel Atrio Boutique Resort, New Delhi.
- Nanning Ivgang int. Center (1.5 million sq. Meters panels), China
- 4 Floor Apartment Building, Nagpur

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Shortlisted by MoHUA under GHTC- India as proven technology.
- Approved by BMTPC under PACS.
- CPWD – Schedule of Rates.
- NBCC India Limited – Approved new technology (Mandatory use).
- MIT - Test certification and approval.
- ILT – London.
- ISO 9001-2008
- CE, GB/T on ISO.



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

3D MONOLITHIC VOLUMETRIC MODULAR PRECAST CONCRETE CONSTRUCTION

*Alternate to conventional RCC framed structure with
bricks/blocks as infill walling material*



Scan QR Code for
Video

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BRIEF

In this system, 3D monolithic modular precast building modules are produced using steel mould and high performance concrete in factory/ casting yard. These modules are transported to the construction site & assembled.

It is a modern method of building by which solid precast concrete structural modules like room, toilet, kitchen, bathroom, stairs etc. & any combination of these are cast monolithically in Plant or Casting yard in a controlled condition. These Modules are transported, erected & installed using cranes, push-pull jacks and are integrated together in the form of complete building unit. Subject to the hoisting capacity, building of any height can be constructed using the technology.

The Agency is providing the technology in association with hoMMission India.

Construction & Installation process

Sequential construction in the project here begins with keeping the designed foundation of the building ready, while manufacturing of precast concrete structural modules are taking place at the factory. Factory finished building units/modules are then installed at the site with the help of tower cranes/ suitable equipments. Consecutive floors are built in similar manner to complete the building structure.



SALIENT FEATURES

- Upto 90% of the building work including finishing is complete in plant/casting yard leading to significant reduction in construction & occupancy time
- The controlled factory environment brings resource optimization, improved quality, precision & finish
- The required concrete can be designed using industrial by-products such as Fly Ash, Ground granulated blast furnace slag (GGBS), Micro silica etc. resulting in improved workability & durability, while also conserving natural resources.
- With smooth surface it eliminates use of plaster
- The monolithic casting of walls & floor of a building module reduces the chances of leakage
- The system has minimal material wastage (saving in material cost), helps in keeping neat & clean construction site and dust free environment
- Use of Optimum quantity of water through recycling
- Use of shuttering & scaffolding materials is minimal
- All weather construction & better site organization
- Can embed Thermal Insulation
- Can come with provision for solar power, Rain water harvesting & IOT.

ECONOMIC ASPECTS

- Faster construction reduces project duration & related project overheads.
- Achieved near conventional cost of construction with superior quality & reduced time duration
- Cost further depends on economies of scale
- Manpower requirement is reduced



SUSTAINABILITY ASPECT

- Upto 90% industrialization ensures reduction in wastages in all raw materials as it is manufactured in controlled conditions
- Use of industrial by-products such as Fly Ash, Ground granulated blast furnace slag (GGBS), Micro silica etc. results in improved durability of structure , while also conserving natural resources (Limestone)
- Use of Optimum quantity of water through recycling
- Use of plastering is avoided

SUITABILITY AND AVAILABILITY

- Suited for all weather conditions.
- Technology is available across the country

LIMITATIONS, IF ANY

- Space for casting yard is required in addition to site for actual construction. The project is not viable if the factory is located far away. Setting up of casting yard requires time in month/(s) depending on project size & delivery schedule
- Requires approach road to site for movement of high capacity trailers, Cranes etc.
- Site should have space for proper leveraging & functioning of cranes
- Requires skilled labor & strict supervision
- Plumbing & electrical services need to be pre-planned
- Requires certain minimum number of houses to be economical





MARKET LINKAGES

- Available Pan India.

MAJOR PROJECT

- 5 Storied building with 20 apartments, cast & assembled in 33 days, Tata Housing at Boisar, Mumbai

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Recommended technology under GHTC-India.



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

MACHINERY FOR PRECAST TECHNOLOGY

*Alternate to conventional RCC framed structure with
bricks/blocks as infill walling material*



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Machinery designer & supplier for Precast concrete elements such as slab, wall, column, beam, staircase & internal partition etc. The precast components are manufactured in controlled conditions in plant/casting yard, leading to improved quality, precision & resource efficiency. The components are transported to site, erected & installed with lifting equipment/ crane and assembled together through in-situ jointing/ grouting etc. The company is 62 years old Finland based multi-national company with presence in India since 2007.



SALIENT FEATURES

- Nearly all components of building work are manufactured in plant/casting yard & the jointing of components is done In-situ leading to reduction in construction time
- The controlled factory environment brings resource optimization, and improved quality, precision & finish
- Helps in keeping neat & clean construction site and dust free environment
- Optimum use of water through recycling
- Use of shuttering & scaffolding materials is minimal
- All weather construction & better site organization
- Thermal barrier is based on thickness of components, provision for insulation may be made for required thermal efficiency
- Suitability for individual /scattered & low to medium height (G+3) houses also.

ECONOMIC ASPECTS

Large number of modular housing units brings economy in construction. The moulds & other equipment need certain minimum number of repetitions to be economically viable.



SUSTAINABILITY ASPECTS

- Precast components optimize the use of materials such as steel, cement etc. and hence bring sustainability & lower CO2 emission (Carbon footprint) in building construction.
- The concrete can use industrial by-products such as Fly Ash, Ground granulated blast furnace slag (GGBFS), Micro silica etc. resulting in improved workability & durability, while also conserving natural resources.

SUITABILITY AND AVAILABILITY

- Can be designed to suit all climatic conditions.
- The technology is available across the country and for all scale of construction.

LIMITATIONS, IF ANY

- Space for casting yard is required in addition to site for actual construction. The project is not viable if the factory is located far away. Setting up of casting yard requires time in month/(s) depending on project size & delivery schedule
- Site should have space for proper leveraging & functioning of lifting equipment/cranes
- Requires skilled labour & strict supervision
- Plumbing & electrical services need to be pre-planned.

MARKET LINKAGES

- Available Pan India.





MAJOR PROJECTS

- Already set up more than 35 plants at various locations across the country.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- The overall design of the structure shall be done in accordance with IS 875 (Part 1 to 5), IS 456:2000, IS 1893(Part 1): 2016, IS 13920:2016 and IS 15916:2010, as applicable. Large panels shall be in accordance with the provisions of IS 11447:1985.
- Getting established through use of various Public as well as Private Agencies



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

PRE-FABRICATED CEMENT SANDWICH PANELS

Alternate to conventional brick/block masonry wall



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Video

CONTACT DETAILS

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BRIEF

These are factory produced lightweight solid core sandwich panels made of 5mm non asbestos fibre cement boards on both sides as facing sheets and the core material of expanded polystyrene beads, admixture, cement, sand, fly ash and other binding materials in mortar form. The ready to install panels are user friendly alternate to conventional walls. The dimension of panel is 3000mmX610mm-60mm/ 75mm/ 90mm. It is primarily non-load bearing walling panels, which is used in the construction of houses/buildings etc. The product has been developed by the Agency in the year 2011 at Surat, Gujarat.





SALIENT FEATURES

- The system is dry walling system, brings speed in construction, water conservation (no use of water for curing of walling components at site).
- The sandwich panels have light weight material as core material, which brings resource efficiency, better thermal insulation, acoustics & energy efficiency
- Being light in weight results in lower dead load of building & foundation size
- Higher stories can be constructed using structural frames
- Being factory produced, ensure consistent quality
- Durable for about 45 years.

ECONOMIC ASPECTS

Being factory-produced component, the cost competitiveness depends on economy of scale.

SUSTAINABILITY ASPECTS

The panels use fly ash, an industrial waste, have low density with less amount of materials consumed, lower foundation size in buildings, along with high thermal efficiency, make this product sustainable.





SUITABILITY AND AVAILABILITY

- Due to Good Insulation property it is suitable for all zones. Structures can be designed as per local climate and geographical requirements.
- Available at all places. The plant can be installed near the project site if the quantum of product requirement is high.

LIMITATIONS, IF ANY

- The joints of panels with each other need to be perfectly locked by materials (cement, glue, dowel bars, polymer modified mortar etc.) & mechanism (levelling of panels etc.) prescribed by Panel manufacturer
- Cutting/chiselling of panels for openings such as doors, windows, service conduits etc. requires little training & through tools/machines prescribed by Panel manufacturer
- The panels if used as floors/ roofs, shall require screeding concrete of minimum 35 mm thickness with nominal reinforcement/ GI wire mesh for monolithic action to avoid leakage through panel joints
- Multi stories houses/buildings require structural framing system with Steel section/RCC Column, beams etc.





MARKET LINKAGES

- Products are available at factory and can be transport across the Country.

MAJOR PROJECTS

- Navarachana University, Vadodara
- BhagwanMahavir University, Surat
- PithawalaCollege, Automobile -Nexa Godhra, Royal Enfield- Surat, Bardoli – on going
- HBK Contracting Labor camp, Qatar, 500 quarters with G+4 configuration.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- PAC by BMTPC.
- Panel is covered under CPWD DSR 2021.



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



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Technology Detail

V CEMENT FIBRE BOARD PANELS WITH LGSF

*Alternate to conventional RCC framed structure with
bricks/blocks as infill walling material*



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Video

CONTACT DETAILS

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BRIEF

Vnext Boards are autoclaved fibre cement boards which comprise of non-asbestos composite matrix containing special grade cellulose fibres, ordinary Portland cement, fine silica, quartz and mineral additives. It is manufactured using the Hatschek process and High Pressure Steam Curing (HPSC) technology as per IS 14862-2000. The boards are Termite, Water and Fire resistant. These are increasingly being accepted by the real estate and interior design fraternity, for variety of applications like Partition, Mezzanine flooring, false ceiling etc. in residential, commercial buildings etc. Vnext Premier boards are used for external applications. These boards are suitable for prefabricated applications including with LGSF & PEB structures.

The Agency is one of the leading manufacturers of cement fibre boards in the Country.





SALIENT FEATURES

- Fire, water, termite resistance,
- Easy to work with,
- Facilitates speedy construction,
- Durable as compared to plywood and wood.
- Increases carpet area as compared to conventional brick masonry wall
- Results in water conservation (no use of water for curing of walling components at site)
- Highly suitable for hilly & difficult regions along with LGSF

ECONOMIC ASPECTS

- Long life span
- Low maintenance requirement
- Economical as
 - o No curing required
 - o No plastering required
 - o Reduces cost of painting
 - o Saves on sub- structural foundation & steel cost
- Reduced labour cost





SUSTAINABILITY ASPECTS

- Bring water conservation as no use of water for curing of walling components at site
- Reusable, re-constructible and relocatable.
- Resource efficient

SUITABILITY & AVAILABILITY

- o Suitable in all climatic conditions
- o Availability is across the country

LIMITATIONS, IF ANY

The joints of panels with each other need to be perfectly sealed as prescribed by Panel manufacturer

MARKET LINKAGES

- Pan India Availability





MAJOR PROJECTS

- NCC limited
- Infosys
- ICICI Lombard
- Lodha
- Amazon

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Vnext Boards have been certified as Green Pro, & its manufacturing facility is certified GreenCo by CII IGBC.



CATEGORY

PROVEN TECHNOLOGY CATEGORY : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

FIBER CEMENT BOARD WITH LGSF TECHNOLOGY

Alternate to conventional RCC framed /load bearing structure



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Video

CONTACT DETAILS

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everest

BRIEF

Everest Fibre Cement Boards are manufactured from homogenous mixture of ordinary Portland cement treated cellulose fibres, quartz and other select mineral fillers using digitally controlled process. It is manufactured using the Hatschek process and High Pressure Steam Curing (HPSC) technology. It provides dry wall construction for variety of applications in residential, commercial and industrial segments for both Interior and Exterior use.

Light Gauge Steel Framed Structures (LGSF) is based on factory made galvanized light gauge steel components. The components/sections are produced by cold forming method and assembled as panels at site forming structural steel framework of a building of varying sizes of wall and floor. The assembly is done using special types of screws and bolts. LGSF is typically ideal for one to four storey high buildings, especially for residential and commercial buildings & for buildings higher than G+3, it can be used with hot rolled Steel sections. The flooring / slab can be with deck sheet supported on floor joists with in-situ reinforced concrete on the top or in-situ conventional RCC slab.

The sequence of construction comprises of foundation laying, fixing of tracks, fixing of wall panels with bracings as required, fixing of floor panels, fixing of roof panels, decking sheet, fixing of electrical & plumbing services and finally fixing of insulation material & walling panels.

The agency has manufacturing plants for LGSF in Bhagwanpur, Uttarakhand & in Dahej, Gujarat, and for Cement fibre boards in Bhagwanpur, Uttarakhand & one in Nashik District, Maharashtra.



SALIENT FEATURES

- High strength to weight ratio. Due to light weight, significant reduction in design earthquake forces is achieved
- Fully integrated computerized system with Centrally Numerical Control (CNC) machine primarily employed for manufacturing of LGSF sections provide very high Precision & accuracy upto 1 mm
- The speed of construction is very high
- Structure being light, does not require heavy foundation
- Structural element can be transported any place including hilly areas to remote places easily and structure can be erected fast
- Structure can be shifted from one location to other without wastage of materials
- Steel used can be recycled multiple times
- Thermal efficiency, fire rating & acoustics of the building can be designed as per the requirement

ECONOMIC ASPECTS

- Light weight construction with reduced size of foundation & overall economical construction
- Reduces construction time significantly
- Do not require skilled manpower.



SUSTAINABILITY ASPECTS

- Primarily employs dry wall construction, thus reducing water usage
- Steel can be recycled multiple times
- High thermal efficiency can be achieved resulting in reduced cooling load
- The boards have Fly ash as recycled component upto 25%.

SUITABILITY & AVAILABILITY

- LGSF technology is suitable for all climatic conditions & for low and medium height (G+3) houses.
- Technology has been used in extreme cold temperature (in Leh where temp goes up to -20 deg) and extreme hot temperature (Jaisalmer where temperature can go up to above 50 deg. C) as well.
- Technology provider has two plants for LGSF and two plants for Cement Fibre board, and can produce the material in good quantum hence availability is not an issue.

LIMITATIONS IF ANY

- For buildings higher than G+3 & spans above 6 mt, it can be used with hot rolled Steel sections.
- The labors are required to be trained for fabrication/assembly works
- Plumbing & electrical services need to be pre-planned



MARKET LINKAGES

- Available Pan India

MAJOR PROJECTS

- OPGC, Jharsuguda, Orissa (15 Building, G+1) - 1,07,134 sqft, 2017
- NTPC, Dallipali, Orissa (1 Building G+1) - 10,300 sqft, 2017
- IIT Mandi, (25,300 sq.ft., G+2 Structure)
- ITBP/Shiv Nadar Schools, etc.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- IIT Vetting for various LGSF projects.
- Tested by CBRI, Roorkee and other renowned laboratories for specific tests result like fire, acoustic etc.





**GLOBAL
HOUSING
TECHNOLOGY
CHALLENGE** INDIA

Indian Housing Technology Mela (IHTM)

D. Technology Shortlisted under GHTC-India

**D2. Potential Technology Category
– Incubation**

CATEGORY

POTENTIAL TECHNOLOGY – INCUBATION : GHTC-INDIA



PRODUCT / TECHNOLOGY



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Technology Detail

3D PRINTED HOUSES TECHNOLOGY

Alternate to conventional construction system



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Video

CONTACT DETAILS

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BRIEF

M/s Tvasta is a start-up company, which has developed end to end 3D Printing Technology for the construction of house/building. The developed Printing Technology comprises of;

- Hardware (3D Printer, Material delivery system etc.) & Software (Digital Construction software that can print with a BIM file).
- Material (Specialized concrete mix design that can be used for 3D Printing).
- Development of Printing Strategy and Design for Additive manufacturing.

The company has presently filed seven patents & several are in pipeline, these are in the domain of 3D Printing system, materials delivery system, hardware software integration etc. One of its innovation is on material side where it has considerably brought down the cost of material for 3D Printing to comparable level with normal concrete. The company aims to automate 80% of construction including activities such as painting and plastering.





SALIENT FEATURES

- Faster Construction as walls and foundation can be printed in days
- Precision with respect to construction is very high.
- India's first concrete 3D Printer which can 3D print concrete mixture layer by layer with the help of in-house developed specialized software.
- Less waste as 3D printer will utilize the exact amount of material needed.
- Increased affordability due to less wastage and reduced labour dependency. Once the training is done the construction is very easy.
- Labour safety is very high.

ECONOMIC ASPECTS

- With the system, the cost of the construction can be brought down considerably.

SUSTAINABILITY ASPECTS

- Reducing the carbon foot print by introducing other industry waste like fly ash, Silica fume etc.
- Reducing the overall material quantity.
- Using construction & demolition waste to reduce the usage for the natural material.





SUITABILITY & AVAILABILITY

- Suited for all weather conditions.
- It is available, first player to develop this technology

LIMITATIONS, IF ANY

- Technology adoption is difficult, Technology awareness and Codal provision is not available.
- As against suitability of technology against natural hazards, further evaluation/study is required.

MARKET LINKAGES

- Being a start up, the product at prototype stage only.

MAJOR PROJECTS

- 2018 - India's first Concrete 3D Printed Structure inside IIT Madras
- 2020 - India's First 3D Printed House inside IIT Madras
- 2021 - Installed 3 Doffing Unit for the Covid - Ward Doctors across Chennai in 3 different hospitals





CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Fresh Concrete Testing - Extrudability, Buildability, Flowability, Open Time, Bleed Value, etc.
- Mechanical Characterization - Compressive Testing, Flexural testing, Bond Strength, Porosity, etc.
- Structural Component Testing - Wall Module Testing
- Under Incubation at IIT, Madras



CATEGORY

POTENTIAL TECHNOLOGY – INCUBATION : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

AUTOMATIC BLOCK LAYING MACHINE (ROBOTIC)

Alternate to conventional construction system



Scan QR Code for
Video

CONTACT DETAILS

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FAVO ROBOTICS

Construction Automation made Accessible

BRIEF

Automation solutions for construction industry using an assistive block laying machine and a robotic platform capable of automatic block laying for construction of walls. The block-laying machine automatically builds walls by picking up solid/ hollow concrete blocks, AAC blocks etc., and leveling and placing it according to specified plan. Agency is a robotics start-up developing a collaborative robot called Auto-Mason to automate onsite brick masonry work to increase the quality of work, productivity and reduce the cost of construction. A 4 axes mobile robot works in collaboration with 3 helpers to automatically build walls.



SALIENT FEATURES

- Robot does automatic placing, mortar application, leveling, and building of walls without any undulations & unevenness
- Can increase the quality & productivity of the work significantly
- Compatible with any factory-made bricks/blocks of any size and shape
- Robot can lift heavy concrete blocks, which weigh upto 45 kgs.
- Completely made out of Extruded Aluminum profiles to optimize weight and performance. Almost 80% of the components are made in India.
- Significant speed of construction with very high daily output. Can build up to 60 running meters of ACC brick wall of 8 feet height or can lay a minimum of 1200 bricks per day (8 hrs of operation) with the help of 3 helpers
- Suitable for low rise buildings

ECONOMIC ASPECTS

- A saving of minimum 20% in brick masonry work can be achieved.
- Economic viability increases and the cost of construction decreases as the volume of the project increases.



SUSTAINABILITY ASPECTS

Helps build a superior construction with better workmanship & no human error. Very little or no wastage is ensured.

SUITABILITY & AVAILABILITY

- Suitable in any climatic conditions, however, electricity needs to be available.
- The final testing in open environment is in progress

LIMITATIONS, IF ANY

- The first and last layers should be done manually
- Bricks at the edges of the wall smaller than the robot gripper need to be placed manually
- Not compatible with country bricks or 3rd class bricks

MARKET LINKAGES

- Presently in proto-type/ demonstration stage & also under incubation at IIT Kharagpur.



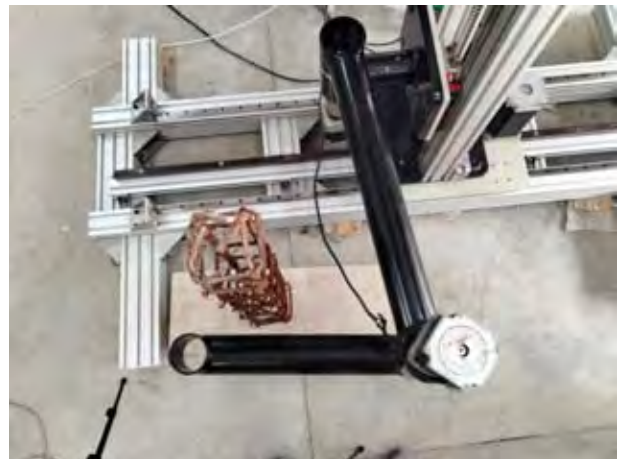
MAJOR PROJECTS:

No projects at this stage, the final testing in an open environment is in progress, however, some projects scheduled in future, include;

- Demo projects scheduled in Bangalore and Hyderabad towards the last week of October 2021
- Pilot project scheduled to begin in Bangalore during 2nd week of November 2021
- The official launch and available for commercial use on rental basis from January, 2022

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- o Under incubation at IIT, Kharagpur.



CATEGORY

POTENTIAL TECHNOLOGY – INCUBATION : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

GHARAUNDA TECHNOLOGY FOR HOUSING USING TREATED BAMBOO & COMPRESSED MUD BRICKS

Alternate to conventional Brick/Block load bearing structure



Scan QR Code for
Video

CONTACT DETAILS

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DRISHTEE
SUSTAINABLE COMMUNITIES

BRIEF

Gharaunda is Drishtee Foundation's housing initiative, supported by Indian Housing Federation, that is focused on the development of housing models for the lower-income population of semi-urban & rural India. It aims to improve the minimum standard of housing conditions in these areas and to create new livelihoods based on local resources and housing supply. Gharaunda's main guidelines are:

- Demonstration of use of locally available materials that are natural and renewable as permanent buildings' components;
- Introducing housing features that ensure safety, comfort, hygiene, disaster resilience and basic infrastructure.
- Development of local market-based mechanisms taking into consideration forward & backward linkages and supply & value chains.
- Develop & support implementation of capacity building programs for delivering such product/ service.



SPECIAL FEATURES

- Treated bamboo as the primary construction material
- A strong and durable concrete plinth as a primary flood resilience feature
- A fire-proof central fire place as a means to preserve their culture
- Elevated floor and elevated platform (mezzanine) inside the house as a flood resilience feature
- Toilet, bathroom and clean drinking water source provided within the core structure
- A 3-layered roof to ensure optimal thermal insulation and acoustic proofing
- Double walls for structural strength and thermal insulation
- Modular partitions to keep the space organization flexible
- Double height ceiling to allow improved ventilation and exhaustion

ECONOMIC ASPECTS

- Cost Effective
- Does not require skilled manpower.



SUSTAINABILITY ASPECT

- Environment Friendly

SUITABILITY AND AVAILABILITY

- It is especially relevant for seismically active regions like North-eastern India.
- Standardization of treatment process of bamboo to ensure strength, durability (termite infestation) & safety (fire resistance) is required.

LIMITATIONS, IF ANY

- There is a need for standardisation of treatment process to ensure strength, durability (termite infestation) & safety (fire resistance)
- The roofing system tried in the existing prototypes is good in providing thermal comfort but is very complicated to assemble and uses thatch, which has very limited durability. Hence, there is a requirement for an alternative roofing solution addressing these issues.
- The current walling solution provides thermal comfort but is very prone to insect infestation, which needs to be solved.
- Determining the life span of the structure is essential.
- Applicable mostly to rural areas.



MARKET LINKAGES

- Can be used in locations which have availability of bamboo.

MAJOR PROJECTS

Due to the site characteristics of rural areas of Bihar, the first Gharaunda model house was built with compressed mud bricks and bamboo as the primary construction materials. The house typology is based on traditional ways of living but a few different features were introduced to alter some rooted habits mainly regarding hygiene and gender segregation.

Gharaunda II experimented with bamboo as a construction material and therefore, in 2018 Gharaunda initiated its second project for the Mising (a tribal) community of Assam. Durability and flood resilience emerged as the primary considerations for Gharaunda II.

CERTIFICATION/INDIAN STANDARD/ENDORSEMENT

- Under incubation at IIT, Kharagpur.





**GLOBAL
HOUSING
TECHNOLOGY
CHALLENGE** INDIA

Indian Housing Technology Mela (IHTM)

D. Technology Shortlisted under GHTC-India

D3. Potential Technology Category – Acceleration

CATEGORY

POTENTIAL TECHNOLOGY – ACCELERATION : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

STRUCTURAL SYSTEM / TERRACOTTA BLOCKS

Alternate to conventional construction system



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

Apna Ghar Construction system is an innovative housing construction system, which is based on porotherm Clay/ Terracotta blocks, made of silt, industrial wastes etc. These blocks can be used as load bearing/ non load bearing blocks in house construction.

As per the structural requirement, columns, lintel/beams are constructed with concrete & reinforcement & with terra cotta hollows blocks acting as permanent stay in place formwork. The floor/roof is made with hollow clay blocks supported on ISMB as joists & 60 mm screed concreting with nominal reinforcement on the top of it. The terra cotta blocks give quite an aesthetic appearance, and does not require external internal plaster & paint on it. This innovative system has been developed by the Agency in the year 2014.



SALIENT FEATURES

- The Porotherm blocks are perforated & have density about 700 to 800 kg/m³. As a result, the buildings constructed using the blocks are much lighter than RCC construction with ordinary burnt clay/solid concrete blocks as infill.
- Structural Terracotta blocks have compressive strength more than 7 N/mm².
- No heavy machinery is required at site.
- System is user friendly and faster than conventional system.
- Excellent thermal insulation, reduces temperatures up to 6-8 degrees and sound insulation up to 48 db.
- Porotherm brick/blocks are rated green products by Indian Green Building Council & GRIHA.
- System is very much suitable for scattered and upto G+3 storied building and is cost effective.

ECONOMIC ASPECTS

- With the system, the considerable reduction in cost has/can be achieved.



SUSTAINABILITY ASPECTS

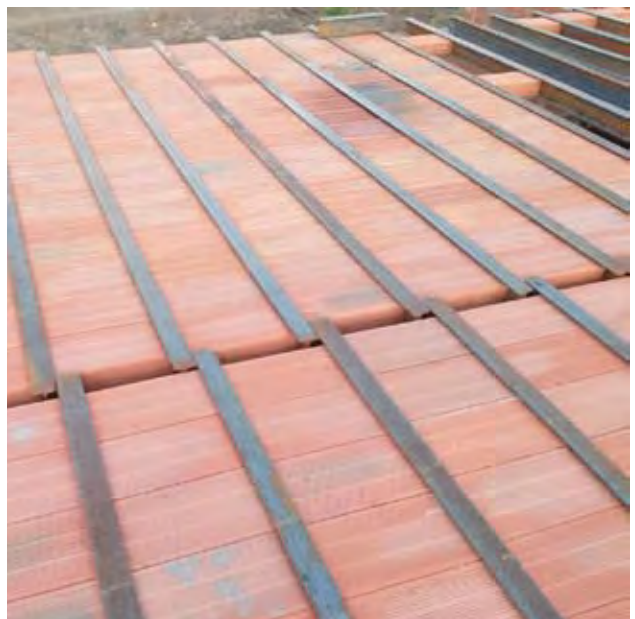
- With perforation, low density, & comprising of silt, industrial waste etc., the Porotherm clay blocks are highly resource efficient.
- Reduction in almost 50% sand, cement, steel, and water consumption can be achieved.
- Helps in sustainable construction and reduction in carbon footprint.
- The system is also thermally efficient.

SUITABILITY & AVAILABILITY

- It is suitable for all climatic conditions.
- The structural clay blocks and steel ISMB are available throughout the country.

LIMITATIONS, IF ANY

- Structural engineer should be consulted for design & connections, particularly in high seismic regions or exposure to other lateral forces.



MARKET LINKAGES

- The agency is based in Nagpur and can provide consultancy and other services for the system Pan-India.

MAJOR PROJECTS

- G+1 Residential building at Dabha, Nagpur.
- G+1 building at Gujarat
- G+3 Structure at Wardha.
- G+2 Residential building at Sonagao, Nagpur

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Recommendation by VNIT Nagpur and BMTPC, New Delhi



CATEGORY
POTENTIAL TECHNOLOGY – ACCELERATION : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

**PRECAST BUILDING COMPONENTS USING PLASTIC,
INDUSTRIAL & CONSTRUCTION & DEMOLITION (C&D) WASTE**

Alternate to conventional building materials/ components



Scan QR Code for
Video

CONTACT DETAILS

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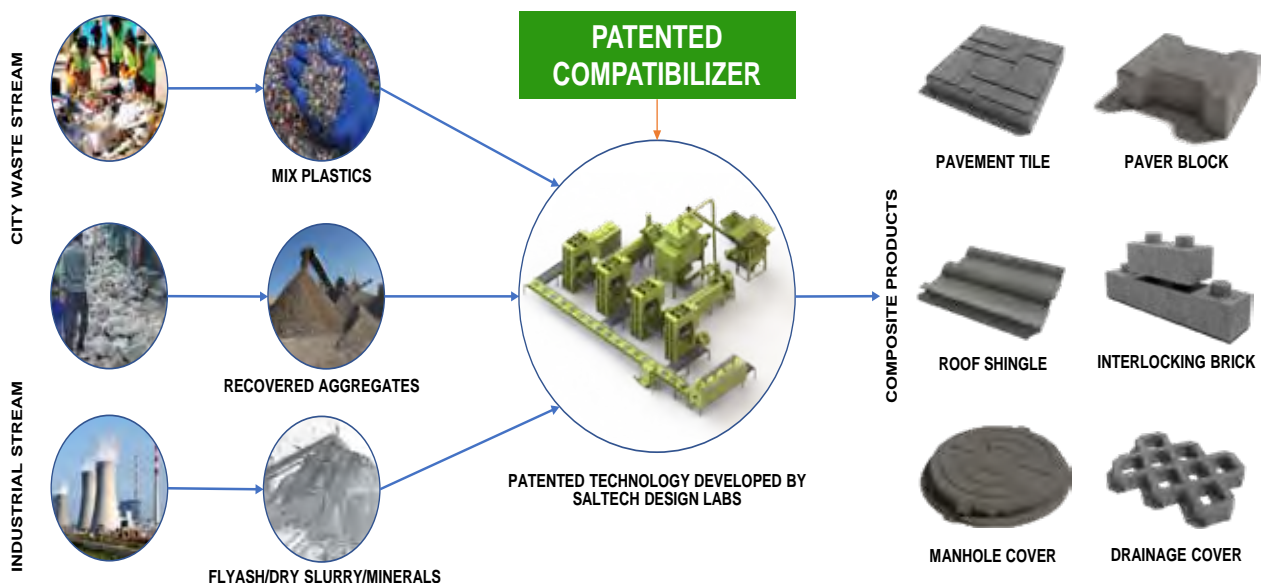
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BRIEF

Saltech design labs has designed & developed machinery which can produce building blocks made out of discarded single use plastic, C&D waste, Fly Ash into high-value alternative composite building materials using polymer as binding material. The aim is to work towards creating a carbon neutral building economy which reuses and recycles the existing waste materials, thus preserving natural raw materials & producing components which are cost effective precast products such as paver, brick, block, roof shingle, and tile etc. The particular emphasis is given to the low-cost affordable housing & infrastructure market to drastically reduce the high costs of construction materials and labour by providing more economical, sustainable and climate-positive factory-made precast products, which are ready to install.



SALIENT FEATURES

- Polymer Composite Material specifications include, Density: 1400 to 1600 Kg/m³, Water Absorption <0.2%, Flame Retardant Category: V2, Compressive Strength (without MS reinforcement): 30 MPa to 75MPa.
- 98% raw material used in the composite material is waste. No requirement of cement & water for manufacturing the material.
- Performance properties are far better than conventional concrete & other products, and durable upto 50 years due to polymer as binder base.
- Multiple industrial solid wastes are used as filler/aggregates, making the manufacturing process carbon negative in nature.
- Modular shapes and interlocking design make it easily deployable. Provides high strength to weight ratio without mild steel reinforcement.
- Overall energy utilized to process per kg of waste into composite material is extremely low as compared to other traditional methods of waste disposal as well as building materials manufacturing.
- Products does not require curing like concrete based products thus reduce inventory space, material, time for manufacturing & help in improving construction speed.

ECONOMIC ASPECTS

- The products are competitive in price with traditional products like concrete, fly ash and clay products.



SUSTAINABILITY ASPECTS

- With significant/almost entire raw materials being waste based, very low requirement of cement, water, energy for manufacturing, these pre-cast products are very low carbon alternate materials & highly sustainable in nature.

SUITABILITY & AVAILABILITY

- Applicable to all climatic conditions.
- The manufacturing technology can be supplied pan India & the agency is open to establish partnership model for local recycling/manufacturing and selling of composite products.
- Presently, the technology is suitable for manufacturing precast products only. New R&D is going on for using it onsite work directly.

LIMITATIONS, IF ANY

- Polymer products applications may be avoided in very high temperature environment



MARKET LINKAGES

- The agency is a start up & presently based in Ahmedabad, however manufacturing/ supplying can be ensured pan India through partnership models.

MAJOR PROJECTS

- Rajkot Municipal Corporation, Govt. of Gujarat.
- Statue of Unity project by Gujarat Ecological Education and Research (GEER) Foundation - Forests & Environment Department, Govt. of Gujarat
- Godrej Properties Ltd - Real Estate subsidiary of Godrej Industries Ltd.
- Tata Housing Development Company Ltd - Subsidiary of Tata Sons Ltd (Tata Group)
- Pandit Deendayal Petroleum University - Academic Institute for Higher Education (Private University), Gandhinagar, Gujarat
- Shrutina Foundation - NGO making old age homes.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

The products/materials have been tested for 8 categories of performance properties in multiple accredited laboratories as follows:

- Central Institute of Petrochemicals Engineering & Technology (CIPET - IPT), Ahmedabad
- Center for Advanced Research in Building Science and Energy (CARBSE - CRDF), CEPT University, Ahmedabad
- Capital Consultancy Engineering Research Laboratory (NABL & GOVT. approved), Gandhinagar



CATEGORY POTENTIAL TECHNOLOGY – ACCELERATION : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

STAY-IN- PLACE FORMWORK MADE WITH GREEN FORM POLYSTYRENE

Alternate to conventional brick/block masonry wall



Scan QR Code for
Video

CONTACT DETAILS

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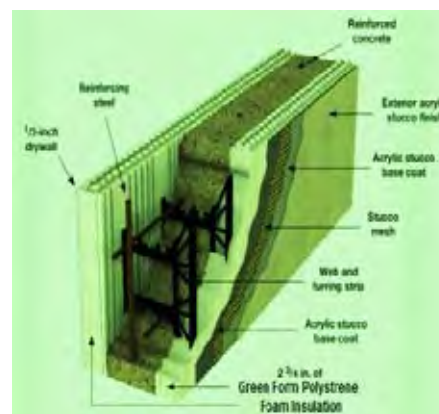
GREEN FORM'S PVT. LTD.

BRIEF

Green Forms is a system of stay-in-place expanded polystyrene formwork for reinforced concrete, made with Green Form Polystyrene Resin, a patented product from recycled thermoplastic. It is an alternate to conventional walls with cast in-situ pouring of concrete along with steel reinforcement.

SALIENT FEATURES

- The panels being light weight, helps in easy installation, transportation & reduction in construction time
- The stay in place formwork system almost eliminates the curing requirement of the concrete
- Buildings have high seismic resistance
- System can be engineered to bear greater loads and can withstand wind speeds up to 200-300 mph.
- Excellent thermal performance due to very low thermal conductivity of Polystyrene.
- The existing buildings can be retrofitted on interior or exterior face, with significant operational energy savings in heating & cooling (upto 70%)



ECONOMIC ASPECTS

There is upfront cost reduction of minimum 20 percent. Being factory-produced component, the cost competitiveness depends on economy of scale.





GREEN FORM'S PVT. LTD.

SUSTAINABILITY ASPECTS

The large generation of plastic wastes is creating a threat to the environment. On the other hand, natural building materials are getting scarce day by day. In this scenario, the conversion of plastic waste plastics to polymer to be used as building material, which is light weight & thermally insulating also, hugely contributes to sustainable construction.

SUITABILITY AND AVAILABILITY

- Green Forms consisting of insulating permanent formworks filled with cast-in-place reinforced concrete, is suitable for all kind of climates.
- Strategic Partnership with Engineering Procurement Companies and Building Solution Providers on PAN India basis.
- Styrene Monomer, a virgin polymer to be used with recycled waste plastic is presently imported. The indigenous production of Styrene Monomer is expected by Indian Oil Corporation Limited at Panipat by the year 2025.

LIMITATIONS, IF ANY

- EPS must be of fire resistant grade

MARKET LINKAGES

- Presently, strategic partnerships are being worked out.

MAJOR PROJECTS

- Pilot Plant established at this stage.

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Start-up India (DPIIT) Recognised: DIPP 956: 2016
- Indian Patent Granted: 2017
- Top 25 Companies in Global Cleantech Innovation Programme: UNIDO & MSME: 2017
- Awarded as one of the Potential Technologies under Affordable and Sustainable Housing Accelerator (ASHA – India), Global Housing Technology Challenge- India, organized by MoHUA, GoI



CATEGORY

POTENTIAL TECHNOLOGY – ACCELERATION : GHTC-INDIA



PRODUCT / TECHNOLOGY



Scan QR Code for
Technology Detail

HABITECH NIVARTANTRA ENVIRONMENT FRIENDLY BUILDING TECHNOLOGY SOLUTION

Alternate system to conventional masonry wall & RCC roof



Scan QR Code for
Video

CONTACT DETAILS

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BRIEF

The Housing / Building Structure technology comprises of two key innovations:

- I. Compacted intermeshing® blocks (CIB) manufactured from local soil judiciously mixed with stabilizers and additives. The production of compacted intermeshing blocks is an entirely green process using novel, simple to use, manual press equipment for small projects and high pressure Hydraulic press system for large projects and unlike conventional brick making process, it does not require kilns / furnace to fire the blocks. These blocks have structural voids for intermittent horizontal and vertical reinforcement to enable appropriate structural strength obviating use of beams, columns and concrete lintels. The voids in the CIB also enable natural air curtain against temperature, noise pollution and water penetration.
- II. “Peggable Contoured®” flat roofing structure comprising Joist & contoured pans manufactured with novel joist and pan making equipment resulting in a flat roof with significantly higher load bearing capacity with much lesser amount of cement as compared to conventional flat roofs.
- III. An onsite Natural Sanitation technology is also offered with Novel Anaerobic “Inclined multi-baffles®” reactor (AIBR) system which enables a significantly better digestion of fecal matter resulting in lower particulate effluent discharge.



Compacted Intermeshing® Blocks (CIB)



SALIENT FEATURES

- Structure made from compacted intermeshing blocks integrated with intermittent vertical and horizontal reinforcements exhibits load bearing capacity, structural stability & service life comparable to conventional RCC structure
- As building blocks do not involve fire, the embodied energy & Green house gas emissions are significantly lower as compared to ordinary burnt clay brick based construction.
- Have better thermal & acoustics properties
- The cement, steel & sand consumption is significantly lower than RCC conventional construction
- As blocks are manufactured locally, helps in generating local employment, reduction in transportation cost & fuel consumption

ECONOMIC ASPECTS

The core structural component – Compacted intermeshing blocks, with significantly lower use of cement and steel in comparison with conventional column/ beam structures, as well as the standardized and simplified construction process results in an overall 10 - 20% cost savings over conventional construction systems.

SUSTAINABILITY ASPECTS

The compacted intermeshing blocks manufactured from the local soil are environmentally cured and not fired in kilns as done in case of conventional bricks. CIB's are almost consuming upto 11 times less energy and also polluting upto 13 times less than country fired bricks.

With lower consumption of cement & steel in blocks & contoured roof, along with better thermal efficiency, makes the technology highly sustainable.

The local employment is also generated for manufacturing of blocks. The excavated area from where soil is sourced, can be used effectively to create a natural water reservoir with simple integrated rain water harvesting thereby resulting in self-reliance in water availability.



SUITABILITY & AVAILABILITY

- The components as well as the building structures created are suitable for all kind of climatic conditions
- The equipment's have been designed and developed in Pune and two established fabrication entities in Pune have been given license to manufacture these equipments. They have successfully manufactured the equipment for the 3 projects till date.
- For large scale manufacture of the equipment, License can be given to fabrication entities across the Country.

LIMITATIONS, IF ANY

- Since all the building components are made on site using equipment, the cost viability is achieved when housing / building clusters are constructed comprising decent plinth size of approx. 20,000 Sq. ft. and above.
- The load bearing structure is limited to G+2 configuration.
- The onsite sanitation system requires slightly bigger area for establishing the constructed wetlands. Hence the sanitation system viability is achieved only in rural / peri urban areas whereas cost of land in urban areas makes it unviable.



MARKET LINKAGES

The agency is based in Pune, however technical know-how & licensee for manufacturing of equipment can be provided across the Country.

MAJOR PROJECTS

- Construction of Technology Innovations Demonstration Model Building – Ashiana Annexe comprising of 12 dwelling units Transit Accommodation at the President’s Estate, Dehradun (CPWD Work order No. 04/EE/PEPD/2016-17 dated 29th August 2016)
- Construction of novel GRAMALAYA using Habitech-NivaraTantra Technologies at SMARTGRAM Harchandpur, Sohna, Gurugram under the Rashtrapati Bhavan’s SMARTGRAM initiative (Size: 218.824 sqmt.)
- Construction (in final stages of completion) of Smartgram Secondary School at SMARTGRAM Daulah, Sohna, Gurugram under the Rashtrapati Bhavan’s SMARTGRAM initiative (Size: ~1693 sqmt.)

CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- Council of Scientific & Industrial Research - Central Building Research Institute was involved in the comprehensive testing of the structural components – compacted intermeshing blocks for the Rashtrapati Bhavan project “Ashiana Annexe” constructed at the President’s Estate, Dehradun and subsequent to successful completion of the evaluation, signed off a Memorandum of Understanding for support in proliferation of Habitech-NivaraTantra Technology solutions in presence of Late Shri Pranab Mukherjee, Honorable President of India during the inauguration of Ashiana Annexe.
- Awarded as one of the Potential Technologies under Affordable and Sustainable Housing Accelerator (ASHA – India), GHTC- India, organized by MoHUA, Gol.



Glimpses of Light House Projects (LHPs)

LHP CHENNAI



Technology: Precast Concrete Construction System-Precast Components Assembled at Site
No. of Houses : 1,152
Country of Origin : Finland/USA

LHP RAJKOT



Technology: Monolithic Concrete Construction using Tunnel Formwork
No. of Houses : 1,144
Country of Origin : France

LHP INDORE



Technology: Prefabricated Sandwich Panel System with Pre-engineered Steel Structural System
No. of Houses : 1,024
Country of Origin : China/ Japan

LHP LUCKNOW



Technology: Stay In Place PVC Formwork with Pre-Engineered Steel Structural System
No. of Houses : 1,040
Country of Origin : Canada

LHP AGARTALA



Technology: Light Gauge Steel Framed (LGSF) System with Pre-engineered Steel Structural System
No. of Houses : 1,000
Country of Origin : New Zealand/ Kenya

LHP RANCHI



Technology: Precast Concrete Construction System - 3D Volumetric
No. of Houses : 1,008
Country of Origin : Germany



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