HIGH STRENGTH LIGHTWEIGHT CONCRETE USING
EXPANDED CLAY AGGREGATE (ECA)
Why Expanded Clay Aggregate (Eca) Is Used?:

The introduction of new methods in strengthening concrete has been under work for decades.

Developing countries like India now use the extensive reinforced construction works materials such as Expanded Clay Aggregate (LECA) and other ingredients in RCC construction.

In the construction industry, major attention has been drawn to the use of fine Expanded Clay Aggregate (ECA) instead of using coarse aggregate or any other materials to make concrete lightweight.
Why Expanded Clay Aggregate (Eca) Is Used?:

In this presentation, the results of a real-time work carried out by light weight Expanded Clay Aggregate (ECA) as good mineral admixtures in the construction of high strength lightweight concrete is showcased.

In an experimental research carried out, it was found out that when Expanded Clay Aggregate (ECA) was used as an aggregate in the making of concrete the tensile strength and the compressive strength of the concrete was at optimal level compared to using other normal aggregate (coarse aggregate) in the construction.
Why Expanded Clay Aggregate (Eca) Is Preffered Against Other Aggregates?

- Expanded Clay Aggregate (ECA) has great resistance against acidic and alkaline substance with a pH of nearly 7 which makes it neutral in chemical post reaction with concrete.

- Expanded Clay Aggregate (ECA) has lightness, durability, non-decomposability, insulating capabilities, chemical resistance, pH neutrality and due to its structural stability it is considered as the best lightweight aggregate for concrete in roofing, flooring, bridge construction and many more. It has a density that is less than or equal to 460 Kg/m3.
Why Expanded Clay Aggregate (Eca) Is Preferred Against Other Aggregates?

Expanded Clay Aggregate (ECA) is environment-friendly, natural, indestructible, non-combustible material, it’s highly impervious to attack by insects, gnats and termites. Lightweight concrete can be basically classified into two:

- **Aerated Concrete**: Has a very light weight and low thermal conductivity. It requires an auto-claying process to obtain certain level of strength and this involves special manufacturing plant and it in turns consumes high energy.
- **Expanded Clay Aggregate (ECA) Concrete**: It has higher strength but exhibits higher density and it has a very low thermal conductivity.
Using Expanded Clay Aggregate (Eca) In High Strength Lightweight Concrete And Its Area Of Application:

- **For Construction on Ground of Poor Bearing Capacity:** For reducing the cost and complexity foundations, even in the most difficult ground conditions. It also enables larger structures to be built for the same load transmitted to the ground.

- **For Structures Whose Self-Weight Exceeds The Loads They Carry:** High strength lightweight concrete enables long-span large precast components, bridges precast roofing slabs, large-span slabs, etc. to be slimmer, with aesthetic and economic advantages.
Using Expanded Clay Aggregate (Eca) In High Strength Lightweight Concrete And Its Area Of Application:

- **Refurbishment and Construction Works in Seismic Zones:** The use of high strength lightweight concrete in the construction of structures lessens seismic stresses, also simplifies the design, and ensures that buildings are safer in the event of an earthquake.

- **Complex Architectural Projects:** The use of high strength lightweight concrete enables structures to be slimmer with fewer structural constraints, and it makes possible for greater designs freedom and more adventurous architectural solutions.
Using Expanded Clay Aggregate (Eca) In High Strength Lightweight Concrete And Its Area Of Application:

- **Refurbishment**: For avoiding excessive loads on existing structures and foundations when floor slabs are strengthened or when extra floors are added to the existing buildings and in all refurbishment works where concrete can be used (columns, loadbearing, wall, edge beams, labs, staircases, balconies, etc.).

- **Reducing Thermal Bridging In The Building Envelope**: Thermal bridging due to structural elements that pass through the external enclosure (roofs, façade, foundations) is reduced by up to 3-5 times. This also reduce heat loss and the risk of building pathologies and facilitate compliance with most demanding regulations and certification protocols.
Using Expanded Clay Aggregate (Eca) In High Strength Lightweight Concrete And Its Area Of Application:

- In Prefabricated Structures And Components: Lightweight precast structural components are easier to maneuver, more economical to transport, can be made slimmer, and have better insulating properties and improved fire resistance as compared to normal concrete.
Categorizing Expanded Clay Aggregate (Eca) By Density Grade:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>DENSITY GRADE</th>
<th>PACKING DENSITY Kg/m3</th>
<th>COMPRESSION STRENGTH (MPa)</th>
<th>WATER ADSORPTION RATE (%)</th>
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<tbody>
<tr>
<td>LIGHT WEIGHT ECA</td>
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<td></td>
<td>900</td>
<td>810-900</td>
<td>6.8</td>
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Benefits Of Using Expanded Clay Aggregate (Eca) In High Strength Lightweight Concrete:

- Reduction of dead load that may bring about reduction in footings sizes and smaller and lighter upper structure.
- Possible reduction in reinforcement and reduction in cement quantity.
- Lighter and smaller precast elements needing smaller and less expensive handling and transporting equipment.
- Reductions in the sizes of slabs, columns and beam dimensions that result in bigger space availability.
- High thermal insulation.
- Enhanced fire resistance
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Manufactured In India