

*Conference on
Adoption of New and Emerging Building Materials
&
Technologies in Construction Industry*

***Introduction of
Artificial Light Weight Aggregate (Low
Density Aggregate) for Concrete***

By Indian Metals and Ferro Alloys Limited (IMFA)

Date : 25th Aug 2023



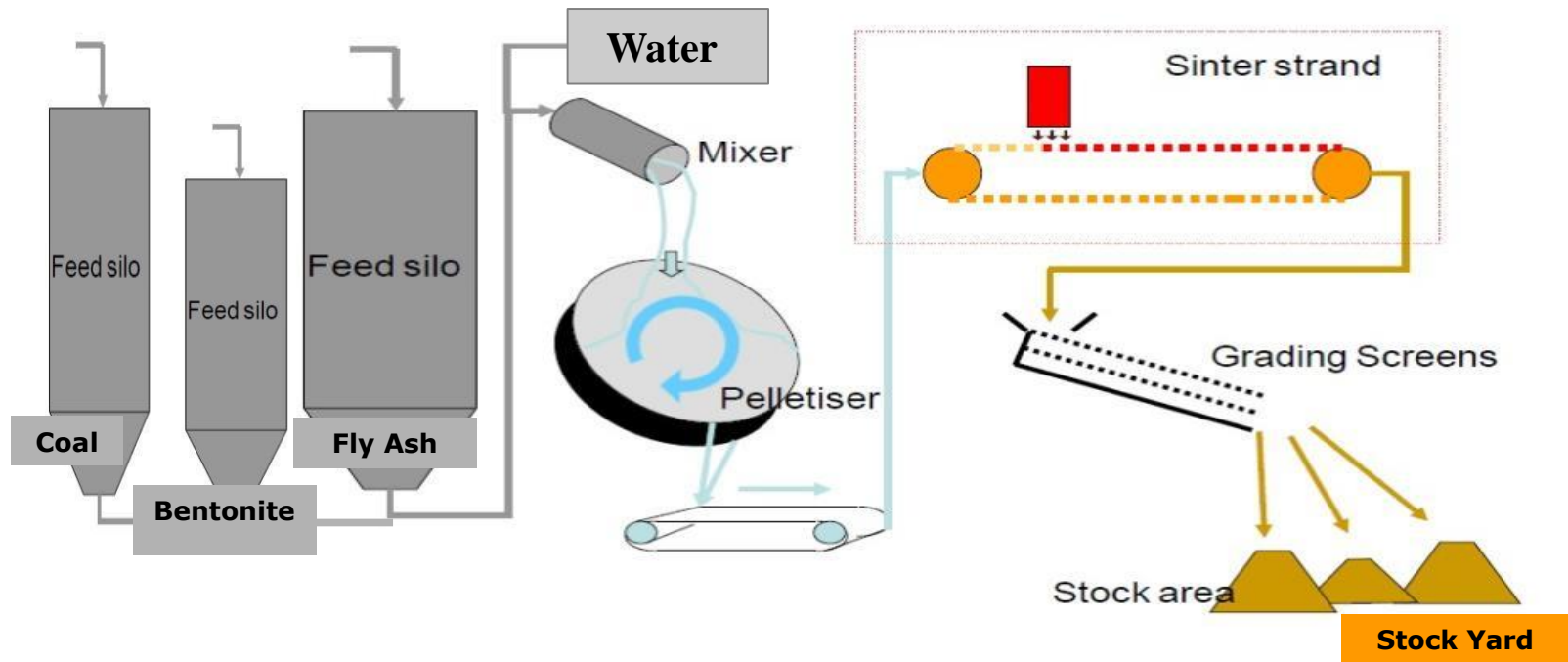
CREATING VALUE FROM WASTE



Light Weight Aggregate At a Glance:

- We are the pioneer in India to produce an eco-friendly product called LIGHT WEIGHT AGGREGATE (LWA) which utilises 90-95% Fly Ash as core raw material, it is generated from our captive thermal power plants.
- The LWA plant was commissioned in 2014 in Choudwar, Odisha with a vision to value add to Fly Ash, reducing the extraction of Virgin stone Chips and creating a green product.
- LWA is an *alternate to natural stone* aggregate and is utilised worldwide for more than five decades. It has a cutting-edge advantage over stone aggregates because of its very low bulk density which makes it comparatively lighter in weight, thus lowering the structural dead load substantially.

Manufacturing Process:



- 90-95% fly ash, coal, bentonite and water to form green pellets.
- Green Pellets are sintered up to **1100 °C** to form LWA.
- Sizes : **8 mm to 16 mm & 4 mm to 8 mm.**
- **Production Capacity : 250 CuM / Day**



Light Weight Aggregate Standards:

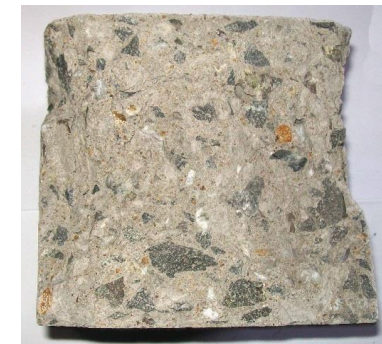
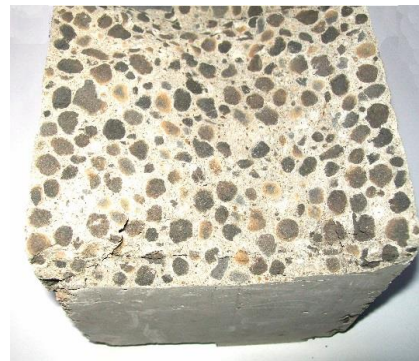
- It is specified by the BIS as “Sintered Fly Ash Coarse Aggregate ” with **IS 9142 (Part-2) : 2018** as its **Standard for use in structural concrete in which the prime consideration is reducing the density of concrete.**
- **Worldwide Standard:**
 - *ASTM : C330-99 – LWA for structural concrete*
 - *ASTM : C1761/C1761M-12 for Light Weight Aggregate for Internal Curing of concrete.*
 - *EU standard 2004 : BS EN 13055-1,2 – LWA Concrete*
BS EW 206-1:2000 – LWA.

LWA Vs Natural Aggregate:

Properties	Low Density Aggregate	Natural Aggregate
Bulk Density	750 – 850 kg/cum	1600 -1950 kg/cum
Water Absorption	14 to 16 %	0.1 to 1.5 %
Specific Gravity	1.45 to 1.65	2.7 to 2.95
Shape	Round	Angular
Thermal Conductivity	0.58 (W/mK)	1.168 (W/mK)

Comparison of Structural Concrete:

Properties	Light Weight Aggregate	Natural Aggregate
Weight of Concrete	1650 to 1950 kg/cum	2400 – 2800 kg/cum
Compactness of Concrete	Higher	Normal
Concrete Mixing Time (RMC)	Same	Same
Internal Curing	Yes	No
Thermal Conductivity	0.68 (W/mK)	2.25 (W/mK)
Steel Usage in Concrete	Less - 15 to 20 % (Theoretically)	Normal



Exclusive Advantages

- Reduction in usage of Natural Aggregate lead to reduction in Carbon Emission and protection of Greenery.
- Reduced dead load by 20% to 25% and thereby reduction in steel reinforcement.
- Slimmer and slender load bearing structures spare more utility space.
- Better compaction tends to minimum shrinkage in concrete.
- Due to the Low density, larger volumes can be transported, reducing carbon emission.
- Internal curing and improved hydration yields progressive strength.
- Higher thermal insulation and good fire resistant properties.
- Precaster's choice due to light and easily portable structures.
- Better concrete pumpability and effortless placement.

Clientele:

Included by Govt. of Odisha in SOR in 2023

Domestic :

M/s UltraTech Cement Ltd. (Various RMC Units)

M/s.Urban Stone INC (West Bengal)

M/s Elevate Building Solutions LLP. (Maharashtra)

M/s Passary Minerals Ltd. (Odisha)

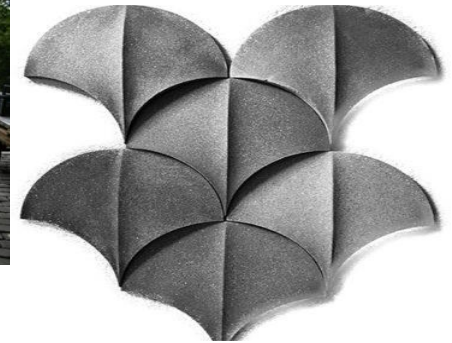
International:

M/s Euro-Agg Limited (United Kingdom)

M/s Innovation World Wide DMCC (United Arab Emirates)

Application Area:

- *RCC & PCC Structures*
- *Wall Cladding*
- *Concrete Tiles*
- *Precast*
- *Screed*
- *Prefab Structures*
- *Multiple Dwelling Units*
- *Insulating Concrete Fill*
- *Filling*



Application Sites:

Rashtrapati Bhawan

LWA was procured by UltraTech RMC, NOIDA is being applied in the form of **Structural Light Weight Concrete (SLC)** of M-20 grade at Rashtrapati Bhawan, New Delhi for casting a Cantilever.



Housing Project at IMFA:



Effluent Treatment Plant & Truck Parking Yard at IMFA



Concrete Road & Culvert Execution at IMFA:



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