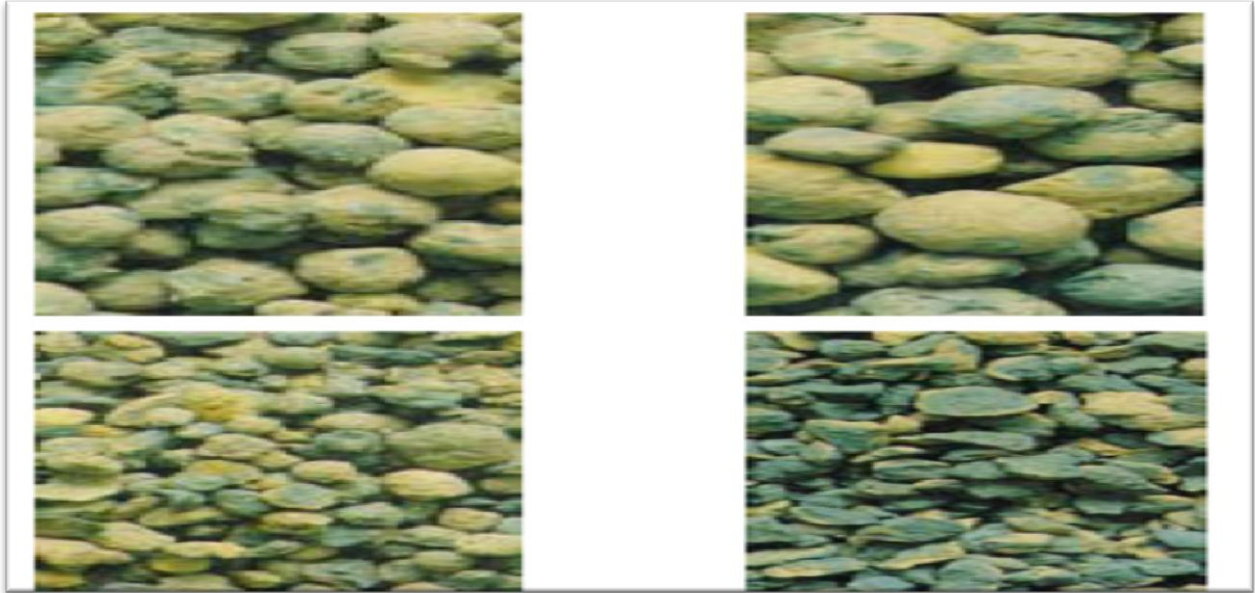


# **LIGHT WEIGHT AGGREGATES (LWA)**

## Light Weight Aggregates (LWA)



Light weight aggregate concrete made out of fly ash is now a replacement for stone chips and can find its use in:

- LWA application
- Light weight concrete blocks and slabs
- Structural light weight concrete
- Floor and roof slabs
- Bridges
- Highway construction
- sound proof and absorption materials

## Why use Light Weight Aggregate (LWA)

- Reduction in weight - reducing loading
- Improve thermal properties
- Improve fire resistance
- Improve Acoustic Properties
- Improve durability
- Environmental benefits

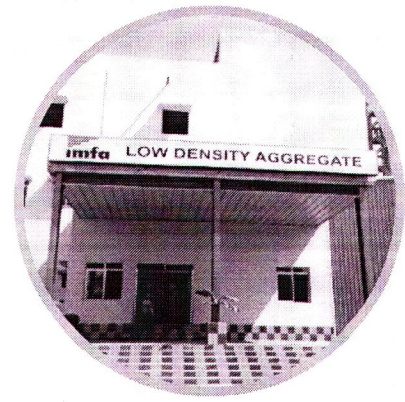
### LWA Plant (JSPL, Angul)

- Plant Capacity :- 3,00,000 M<sup>3</sup>/Annum
- Fly Ash :- 2,50,000 TPA (750 TPD)
- Coal as additive (Sinter Machine) :- 1.6 TPH
- Coal for Producer Gas (Gasifier) :- 1.2 TPH
- Power :- 2080 KWh  
(connected Load 3200 KWh)
- Water :- 15 M<sup>3</sup>/h

### LWAC v Stone chips concrete (Normal concrete)

	<b>LWAC</b>	<b>Normal Concrete</b>
• Density	1400kg/m <sup>3</sup> - 1800kg/m <sup>3</sup>	2300kg/m <sup>3</sup>
• Thermal Conductivity	1.0W.m <sup>-1</sup> .K <sup>-1</sup>	2.0W.m <sup>-1</sup> .K <sup>-1</sup>
• Pumpable	Yes	Yes
• Comparable strength	Yes	Yes
• Surface finish	Yes	Yes
• Admixtures	Yes	Yes

# Low Density Aggregate

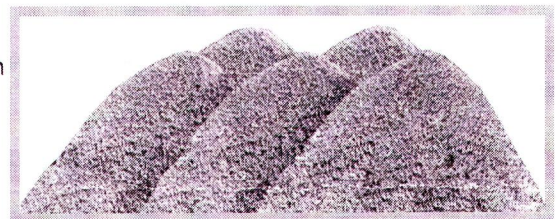


IMFA has put up a Low Density Aggregate(LDA) plant at Choudwar, Dist-Cuttack Odisha and this is the first such plant in India. Low Density Aggregate is a form of 'sintered Fly Ash' and falls under generic Light Weight Aggregate category. The plant is placed close to their thermal power plant and draws fly ash from the power plant ash silos directly. The capacity of the plant is 1,75,000 MT per annum. LDA is an unique product with fly ash as high as 90% . A mix of fly ash, binder and coal are sintered to produce LDA.

LDA is an ideal replacement to stone chips for all kind of concrete applications. IMFA has extensively done tests of their product with various concrete mix design and proven application up to M-30 grade of concrete. They are already using this for their Housing construction, internal concrete roads and culverts. All of their civil construction use LDA only.

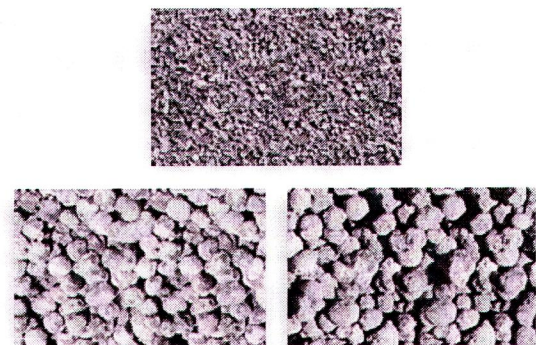
## LDA Characteristics

- Bulk density in air dry condition 750-900kg/cum
- Crushing strength >4 MPA
- Bulk porosity 35%-40%
- Water absorption 12%-16%
- Loss on ignition (Lol) < 4%



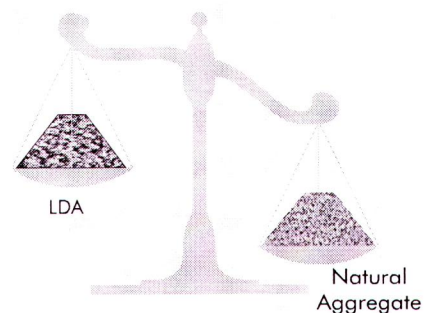
## LDA Sizes

- 2 mm to 4 mm
- 4 mm to 8 mm
- 8 mm to 16 mm



## Major Advantages of LDA

- Light weight
- Thermal & sound insulation
- Fire resistance
- Non de-composable
- Economies in handling

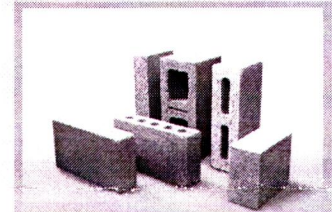
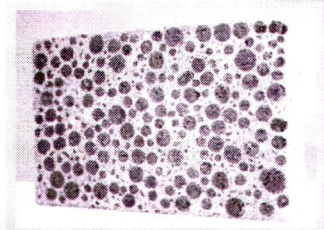


## Comparison : LDA vs Natural Aggregate

Properties	LDA	Natural Aggregate
Bulk Density	750 - 900 kg/cum	1450 - 1750 kg/cum
Bulk Porosity	35% - 40%	40% - 50%
Water Absorption	12% - 16%	0.5% - 1.5%
Specific Gravity	1.45 - 1.65	2.75 - 2.95
LOI of Product	<4%	<4%
Weight of Concrete	1800 - 1900 kg/cum	2400 - 2750 kg/cum
Shape	Round	Angular

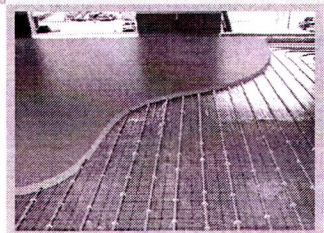
## Characteristics of Concrete Made of LDA @ IMFA

- Lower dead weight of the concrete structure by 20% - 25%
- Reduction of steel reinforcement in concrete structure due to reduced dead weight
- Low shrinkage, reduces micro cracks which improves tightness of the concrete
- Bulk density of LDA concrete ranges between 1800-1900kg/cum
- Higher thermal insulation
- Easily pumpable



## Application of LDA

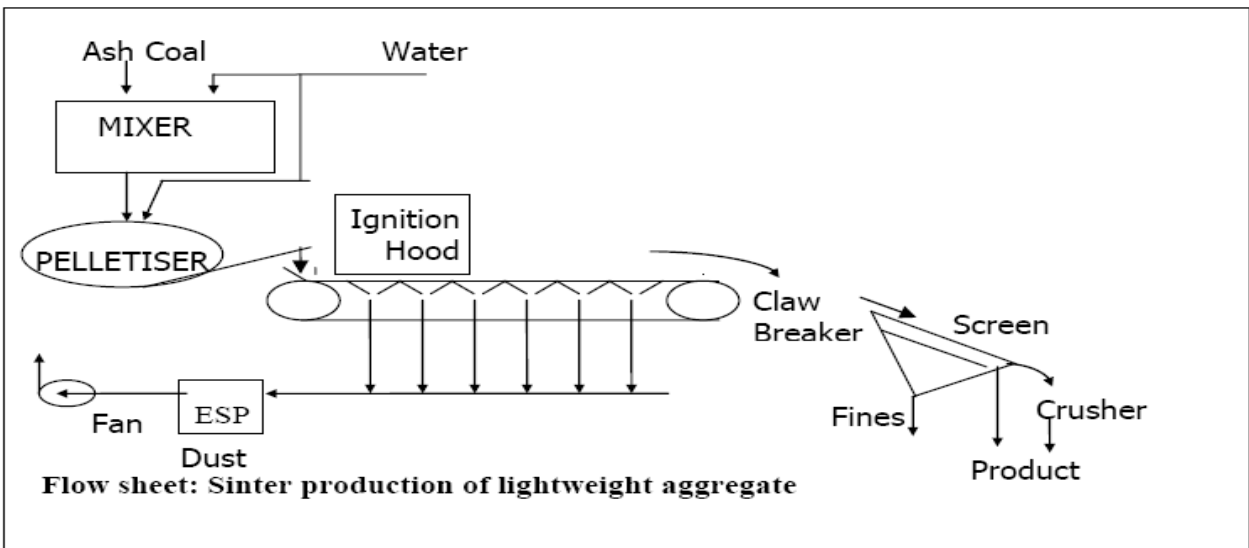
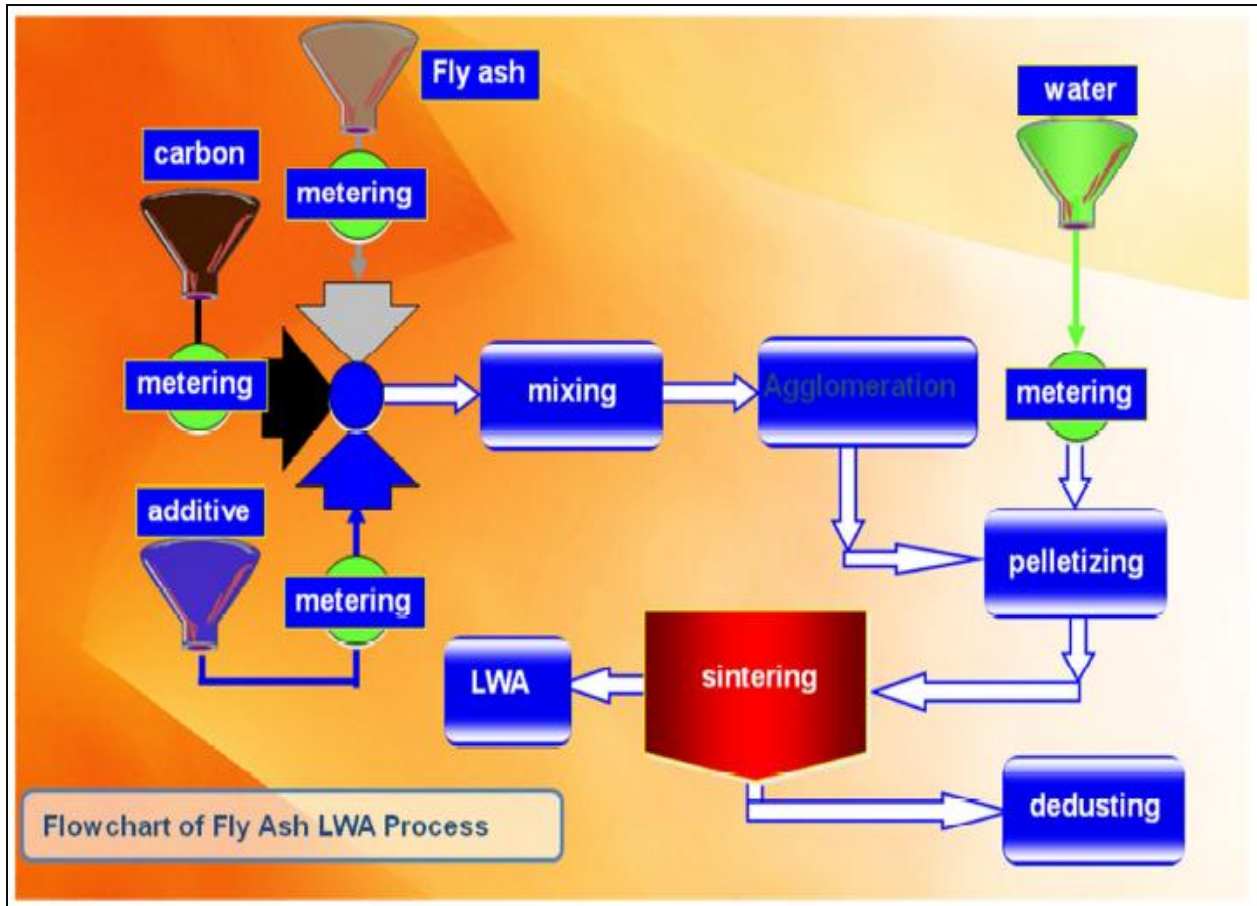
- Structures
- Tiles and prefab
- Precast
- Screed
- Bridges
- Structural fill
- Arrestor bed
- Multiple dwelling units



## Environmental Benefits of LDA

- Contributes to the concept of a greener tomorrow and adheres to the 3R's of waste management i.e. Reduce, Reuse and Recycle
- "A GREEN product for GREEN BUILDINGS"





Basic Process Flow Diagram



### **LWA, JSPL, Angul**

**Indian Standard (IS: 9142 – 1979) Specifies for use of Artificial Light weight Aggregates for Concrete Masonry Units.**

#### **Environmental Benefits:-**

- LWA Project would ensure eco-friendly and bulk utilization of Fly Ash.
- This prevents Natural Quarrying of Hills/Mountains, thereby preserving natural resources.
- No effluent discharge from the Plant
- LWA is an eco-friendly process vs. conventional Stone Crushers operation- which emits lot of dust and sound pollutions.

#### **Chimney Inner Liner, Built in 2004 in China**

In Odisha although the use and manufacture of LWA has not gained momentum IMFA, Choudwar & JSPL, Angul have installed LWA manufacturing units of which IMFA has started manufacture.

**Acknowledgement : JSPL, Angul / IMFA, Choudwar**