Stonecrete Blocks

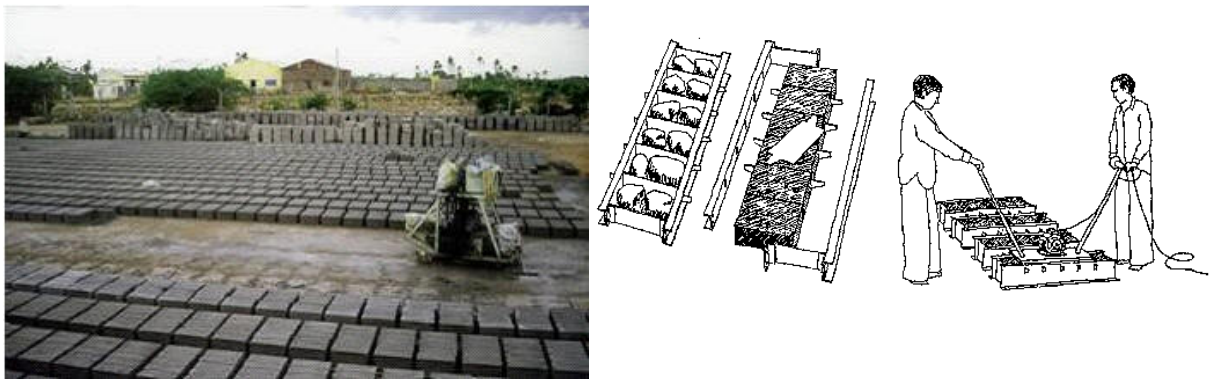

Figure 01: Stonecrete block production

Overview

Stonecrete Blocks are concrete blocks with large stones surrounded by the matrix of concrete. This is an alternative construction material significantly dependent upon the local materials instead of the solid burnt clay bricks that are brought from long distance. It is also called “Pre-cast Stone Block”. This material was developed by the Central Building Research Institute (CBRI) in Roorkee. These types of blocks are made by placing stones that are no bigger than 100 to 125mm in concrete. The use of stone results in to significant saving of concrete. Just like brick masonry, this option also allows fast construction. It is suitable where small stones are easily available. Larger stone too can be broken down to the required size for use in making these blocks. In comparison to the solid concrete block this option results into much saving in cement use since large stones replace significant amount of concrete. Stonecrete Blocks are generally of 300x200x150 mm in size. As a result, they produce walls that are 200mm thick. The stones can be fully encased in the concrete or they can be so placed as to be exposed on the long face. Such blocks with the exposed stone could be used to build wall that has the appearance of a stone wall if not plastered.

During last 20 years, more than 50,000 houses and other buildings have been constructed with these units in almost all parts of the country, especially in Andhra Pradesh, Himachal Pradesh, J & K, Kerala, Madhya Pradesh, Rajasthan, West Bengal and hilly areas of Tamil Nadu and Uttar Pradesh. More information on stonecrete blocks is available from CBRI in its Building Research Note No. 7 titled “Precast Stone Block Masonry”.

CATEGORY	ATTRIBUTE	INPUT	SOURCE
Resource Efficiency	**Embodied energy and CO_2 emission**	*No Data Available*	
	Critical resource use	100	*Source: Calculated critical use index (0-100)*
	Current recycled content	Medium: fly-ash may be added instead of fine aggregates.	*Source: Standards and specifications for cost effective innovative building materials and techniques including rate analysis (second edition), BMTPC, 2009*
	Future reusability	Low; better reusability if lime mortar is used.	

	Water use during construction and manufacturing	Water required for curing for 14 days, <6% water absorption post-construction.	*Source: Building Research Note 7: Precast stone masonry block walling scheme, CBSI Roorkee.*
Operational performance	**Durability**	High, if built according to IS 14213	*Source: Building Research Note 7: Precast stone masonry block walling scheme, CBSI Roorkee.*
	Ease and frequency of maintenance	Low frequency of maintenance	
	Impact on cooling or heating loads	Cooling energy (kWh/m^2/y) savings under different climatic zones Composite: -4.34 (-8%) Warm & humid: -1.85 (-4%) Hot & dry: -6 (13%) Temperate: -2.83 (-19%) Heating energy savings in cold climate: -19.16 (-45%)	*Source: Based on simulations. Values in savings from base case: 225mm solid burnt clay brick with 12.5mm plaster on both sides.*
	Noise transmission	*No data available*	
	Thermal mass (absorption, storage and release of heat)	*No data available*	
	Thermal performance (flow of heat)	U-Value for 200mm wall: 3.4 W/m^2K.	*Source: CARBSE Assembly U-factor calculator*
User experience	**Familiarity with the material**	High	
	Modification ability	Low	*Source: Building Research Note 7: Precast stone masonry block walling scheme, CBSI Roorkee.*
Economic impact	**Construction Cost**	Rs.1070/m^2 (for 200mm thick wall)	*Source: Standards and specifications for cost effective innovative building materials and techniques including rate analysis (second edition), BMTPC, 2009*
	Skill requirement	Low: 1 Skilled mason, 7 Unskilled workers	*Building Research Note 7: Precast stone masonry block walling scheme, CBSI Roorkee.*
	Supply chain	No heavy capital investment. Stones can be sourced from site.	*Building Research Note 7: Precast stone masonry block walling scheme, CBSI Roorkee.*
	Duration of Construction	330 blocks produced per day by 1 mason and 7 unskilled workers.	*Building Research Note 7: Precast stone masonry block walling scheme, CBSI Roorkee.*
	Job creation	Man-days: Fitter: 1.5, Welder: 1, Helper 3, Mason: 0.3, Unskilled workers: 2.12.	*Building Research Note 7: Precast stone masonry block walling scheme, CBSI Roorkee.*