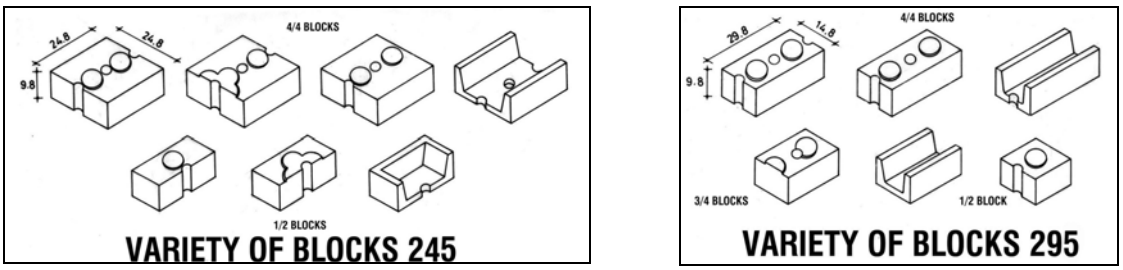
HOLLOW INTERLOCKING BLOCKS

A technology using reinforced hollow concrete block has been developed all over the world since a while. Its principle is to reinforce the masonry by grouting a concrete into the holes of the blocks where stands a steel rod at the critical locations (Corners, ends, near openings, etc,). Horizontal reinforcements are also cast in blocks with a U shape.

The technology using Hollow Interlocking Compressed Stabilised Earth Blocks (HI CSEB) is based on the same principle: to reinforce horizontally and vertically the masonry with Reinforce Cement Concrete (RCC) members. The advantage of hollow interlocking CSEB, compared to hollow concrete blocks, is that they offer keys, which interlock in the other blocks. Thus these walls offer more resistance to shear and buildings would be even stronger. They would better resist earthquakes and without major damages.



Auram blocks for earthquake resistance

Compressed stabilised earth blocks have another advantage: they are in most cases cheaper and they are always more eco-friendly than concrete blocks.

Particular requirements for hollow interlocking blocks

Interlocking blocks can resist disasters (Cyclones, earthquakes and floods), provided that they are hollow, so as to be reinforced with Reinforced Cement Concrete (RCC), at regular intervals. A hollow interlocking CSEB for earthquake resistance must satisfy these requirements:

- Extreme consistency in height (1 mm difference maximum is allowed).
- Self-aligning to reduce time-wasting adjustments.
- Blocks should be hollow and the vertical holes and U shaped blocks should allow casting RCC, according to requirements: To reinforce regularly the masonry vertically and horizontally.
- The interlocking keys must interlock transversally and longitudinally to the wall. They should interlock especially well in the length of the wall, which is subject to the shear stress of the earthquake.
- Every course must interlock with each other as well as the header of every block in length: to increase the shear strength of the masonry.
- Good seating of the blocks on top of each other for properly transmitting the load bearing: All the block area, including the key, must transmit the load.
- A binder must bind them: **they must not be dry stacked**, as the aim is to get a homogenous masonry.
- The binder should be a cement-sand mortar of 5 mm thick. It should be quite fluid in order to be workable.
- The mould must allow manufacturing of full size blocks but also 3/4 and 1/2 sizes. The blocks must not be cut to match the bond pattern, which will be detrimental to the accuracy, strength and quality of the masonry.

Compressed stabilised earth blocks have a poor bending strength but this is not so critical because the block itself will not bend but the masonry will do. CSEB have very poor shear strength, which is critical in the case of earthquakes. Interlocking blocks will not have a stronger shear strength compared to ordinary CSEB. But the key effect will increase the shear strength of the masonry if the cohesiveness of the material is high enough to keep the link between the key and the body of the block. (Especially shocks and vibrations of an earthquake)

The Auram hollow interlocking blocks

The accuracy of the Auram press allows a very regular block height: only 0.5 mm difference in height. This allows the block to get the ideal mortar thickness of 5 mm. Therefore, the block modules are:

- 30 x 15 x 10 cm for the rectangular block 295 (29.5 x 14.5 x 9.5 cm)

- 25 x 25 x 10 cm for the square block 245 (24.5 x 24.5 x 9.5 cm)

The hollow interlocking 295 is only meant for single storey buildings. The hollow interlocking block 245 can safely be used up to two storey buildings only.

The holes have been maximized (regarding the size of the block and the press design) at 5 cm diameter to allow a proper concrete cover for the steel.

The area of the key has been maximized at 9 cm diameter to ensure the maximum adhesiveness of the key on to the block body, so as to resist the shear effect. The height of the key has been determined by having the maximum friction area between blocks to resist the shear and by having the minimum friction on the mould while de-moulding the block from the press. The chamfer angle of the key seeks to be optimum.