

DEVELOPMENT WORKSHOP

ON INDIGENOUS BUILDING METHODS IN THE THIRD WORLD
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SOLAR ENERGY AND SMALL-SCALE GYPSUM PRODUCTION

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SOLAR ENERGY AND SMALL-SCALE GYPSUM PRODUCTION

Good quality gypsum (gatch) deposits have recently been found in the low hills to the west of the Selseleh Basin. Deposits are often found in a crystallised form.

Uses:

Gypsum has a variety of uses. In agriculture, as a fertiliser, it provides plant nutrients to alkaline soils. It can also be used in composts for mushroom growing.

Building Purposes:

Large quantities of gypsum are used in the manufacture of cement. Gypsum makes up 3 or 4% of cement by volume.

Gypsum has been used in the past in Egypt and the Middle East as a masonry mortar.

Gypsum blocks or bricks for wall building are common in some parts of the world.

Gypsum is probably best known for its use in plasters and plasterboards in the building industry.

Production:

Gypsum in its natural form is crystalline, which contains two molecules of water for every molecule of calcium sulphate. Chemical formula is $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

Gypsum to be made useful must be baked or fired. To produce the dehydrated product known as hemihydrated gypsum, 75% of the water must be driven off by heating the gypsum to 165°C . Chemical formula is $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$

A harder material, anhydrite gypsum, can be produced by heating gypsum to 200°C . Chemical formula is CaSO_4

The material must be ground to a powder and kept dry before use. For building purposes water is added to the hemihydrated or anhydrite gypsum to make a paste which again sets hard in a short time.

Solar Kilns for Gypsum Firing

Gypsum kilns need to generate temperatures between 165 and 200°C . Kilns which develop temperatures somewhat below 165°C , sustained over longer periods are also suitable for gypsum production.

Temperatures up to 200°C , for industrial purposes can be generated by solar energy. Solar kilns for the production of gypsum are therefore feasible. Experimental kilns for small-scale production can therefore provide an alternative economic base for a small community.