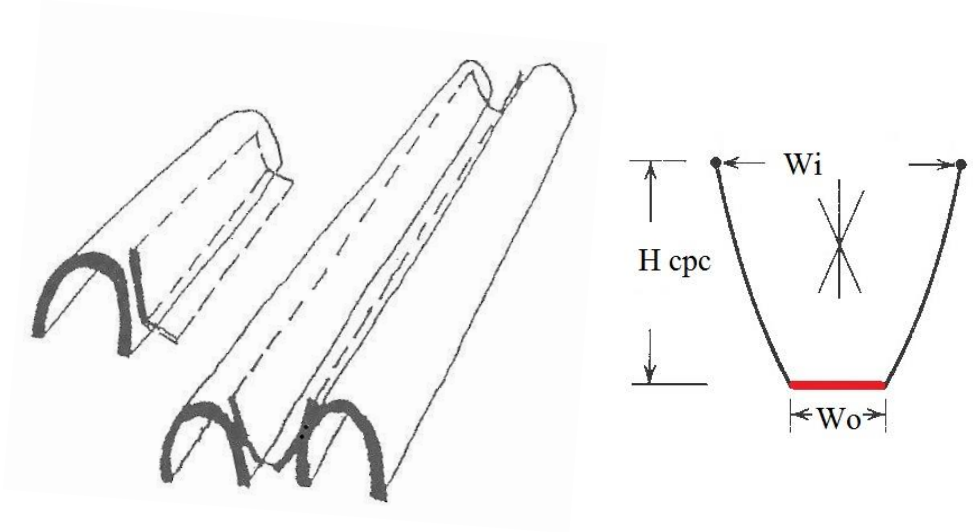
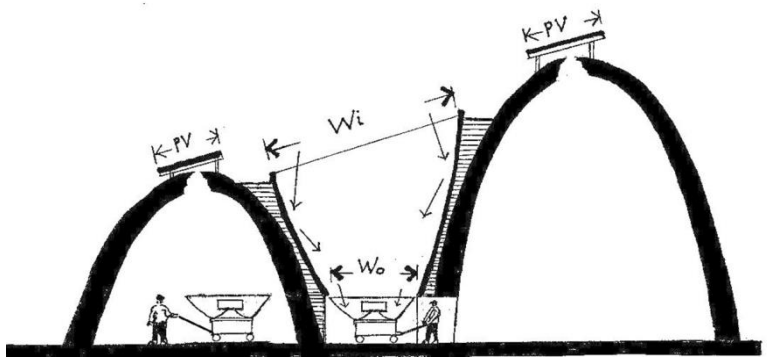
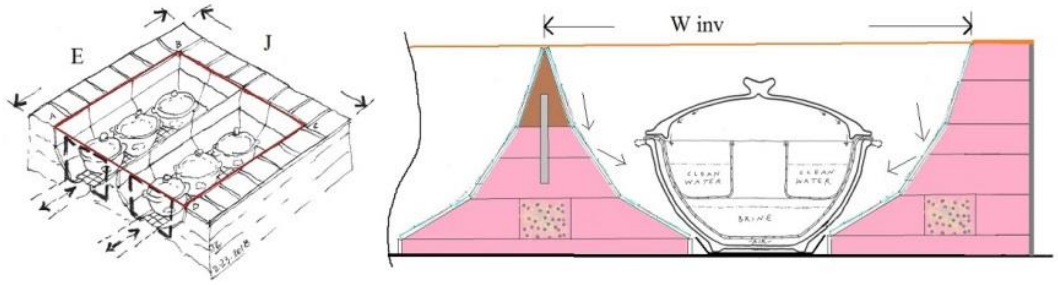


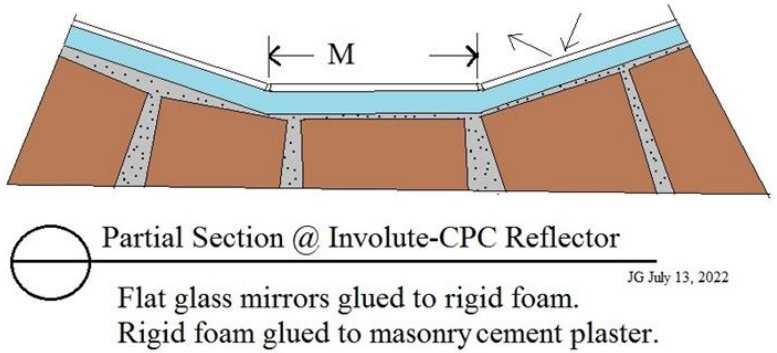
There is a correspondence between building size nonimaging CPC fixed mirror troughs mainly for the tropics and linear vault building structures e.g., masonry vaults with compressed stabilized earth blocks.



Thru-Reflector-Wall (TRW) Nonimaging concentrator solar kitchen studies

Joel H. Goodman July 18, 2022





Flat glass mirror (M) glued to rigid foam which is glued to cement plaster should be tested to see if there is ion exchange damage to silver backed mirrors.

Fig. Thru-Reflector-Wall (TRW) nonimaging concentrator solar kitchen studies

Flat glass mirror segments are glued to rigid foam. Cut rigid foam sheets are glued together to form substrate for secondary nonimaging concentrator mirrors in the target rectangle (TR). Foam exposed to sunlight has glued on tiles. Glazed or unglazed cookware on trays slide in-out of caustic zone. The top ridge reflector has flat glass mirrors glued to wood glued to foam with dowels. Sand and gravel glued within the foam is for stabilizing weight or spaces could be empty. An inverted foam injection mould holding joint-taped mirrors and tiles would lessen glue expenses. The TR reflectors are secondary concentrators that receive reflections that will heat the foam substrate depending on reflectivity of mirrors. Polystyrene softens at 73C/165F and urethane foam limit is about 62C/80F. Other types of rigid foam insulation can tolerate temperatures of about 230C / 446F.

Thru-Reflector-Wall (TRW) Nonimaging concentrator solar kitchen studies

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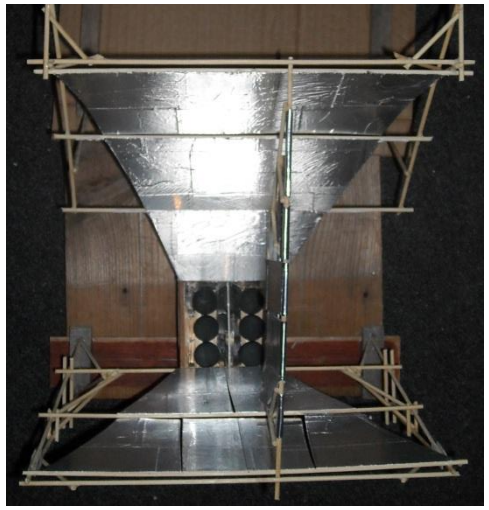
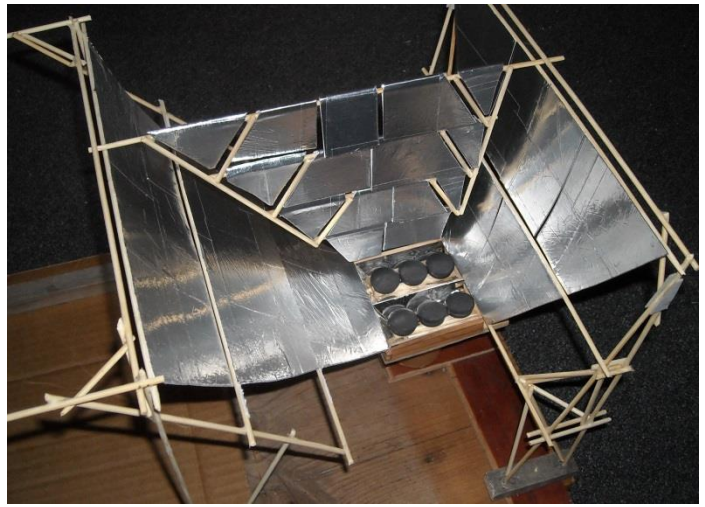
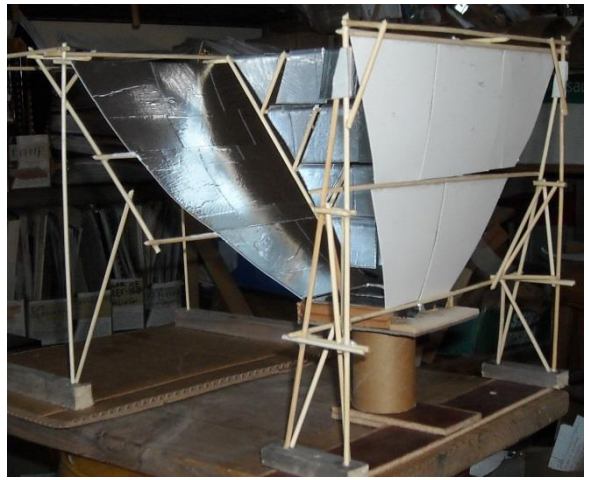
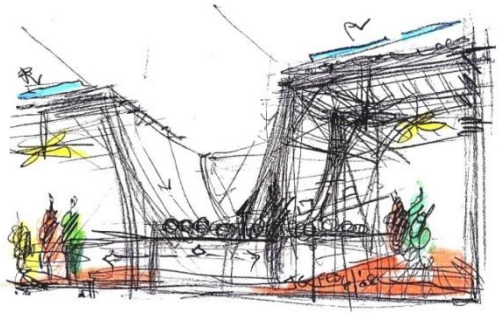






Bamboo CPC open-air solar cooker-kitchen
Sketch model photos

The complexity of permanent masonry TRW constructions (door frames, site commitment, costs, etc.) may be preceded with bamboo TRW open-air pergola kitchens and test stands developing proof-of-concept experiences.



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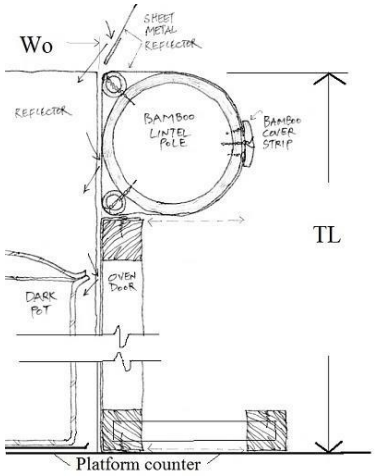
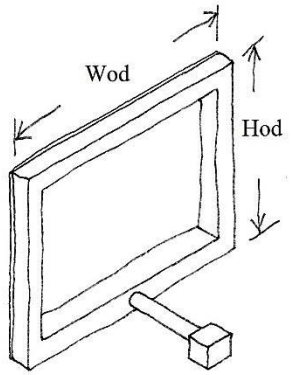




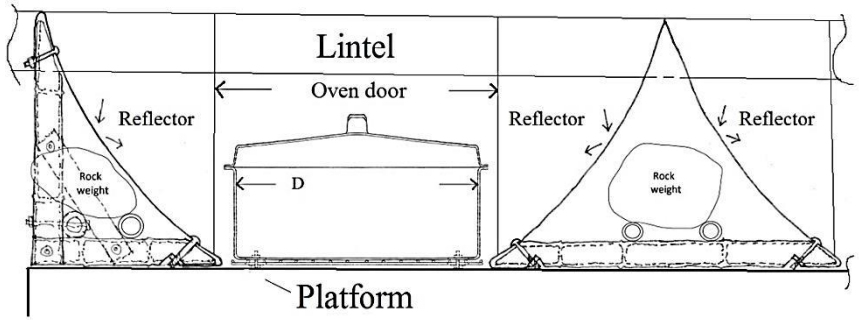
The top of the horizontal bamboo lintel is at the same level as the top ridges of the TR reflectors. The big CPC trough design-shape is fixed all year with large acceptance angle and low concentration ratio. CPCs are discussed in solar energy engineering books, e.g.

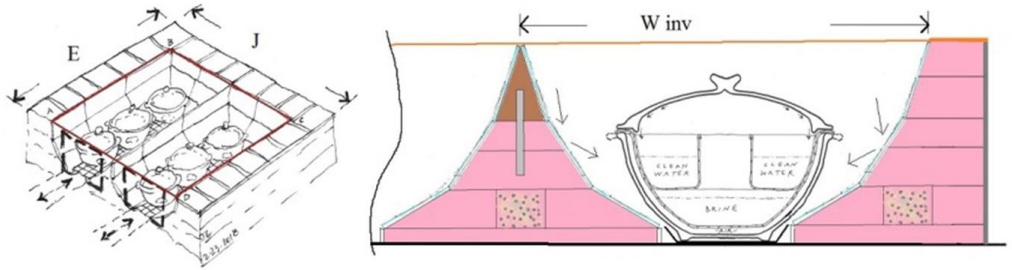
( ) Duffie, John A. and William A. Beckman, Solar Engineering of Thermal Processes, 1980, Wiley.

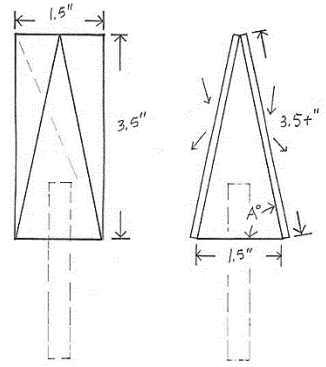
( ) Sukhatme, S.P., Solar energy principles of thermal collection and storage, Tata McGraw-Hill, 1984.

CPC troughs were developed in Ooty, India, c1990 .

( ) Jayaraman, S., K. Perumal, and V. Balasubramanian, Development of CPCs in India, WREC-1, Reading, UK, 1990.







Wood involute ridge—the top flat glass mirror width may be determined by wood working capability.

Thru-Reflector-Wall (TRW) Nonimaging concentrator solar kitchen studies

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