

## C535102: MAJOR ARCHITECTURE

KEY WORD: : PASSIVE COOLING/ COOLING TUBE/ INDIRECT EARTH TUBE

SUPOJ TUANGSINTAWEEKUL : COOLING SYSTEM THROUGH UNDERGROUND TUBE.

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This research has the objective to study building cooling system through underground tube. An experiment is placed in Bangkok during March to April 1994.

The experimental model comprises a main stainless tube, which has 0.55 mm. thickness and 16 inch diameter, and three branched tubes, which all 8 m length and 8 inch, 10 inch, and 12 inch diameter each in the order given. This model is placed underground 1.10 m. depth. An electric fan is used to ventilate air through the tube. Thermocouples are positioned along the interior tube to measure and keep all temperature data.

The result of consideration :

-Stainless tube which has 12 inch, diameter can reduce air-temperature which is through the tube in daytime more than sized 10 inch and 8 inch diameter.

-Soil-temperature, which has 1.10 m depth, is stable although air-temperature varies through the day.

The study shows that the temperature of the ventilated air which is through the tube, is decreased in daytime and increased in nighttime. The diversity of temperatures is put into the process of regression for finding the relation with other factors such as air-temperature, soil-temperature, wind-speed through the tube and the internal surface of the tube as the following principle :

$$HE = -1.873 + 0.295(OS) + 0.019(A) + 0.002(V)$$

OS = Difference of temperature between air-temperature and soil-temperature (°C)

A = Internal surface of tube (ft<sup>2</sup>.)

V = Air Flow (CPM)

HE = Cool Down (BTU/Hr)