

## Design Optimisation of Compound Parabolic Concentrator (CPC) for Improved Performance

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**Abstract :** A compound parabolic concentrator (CPC) is a well known non-imaging concentrator that will concentrate the solar radiation onto receiver (PV cell). One of disadvantage of CPC is has tall and narrow height compared to its diameter entry aperture area. Therefore, for economic reason, a truncation had been done by removed from the top of the full height CPC. This is also will lead to the decreases of concentration ratio but it will be negligible. In this paper, the flux distribution of untruncated and truncated 2-D hollow compound parabolic trough concentrator (hCPTC) design is presented. The untruncated design has initial height,  $H=193.4\text{mm}$  with concentration ratio,  $C_{(2-D)}=4$ . This paper presents the optical simulation of compound parabolic trough concentrator using ray-tracing software TracePro. Results showed that, after the truncation, the height of CPC reduced 45% from initial height with the geometrical concentration ratio only decrease 10%. Thus, the cost of reflector and material dielectric usage can be saved especially at manufacturing site.

**Keywords :** compound parabolic trough concentrator, optical modelling, ray-tracing analysis, improved performance

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