

An optical technique for evaluating the shape of reflective parabolic trough

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Development and testing of an optical technique for evaluating the shape of reflective parabolic trough is reported. This method consists of a single axis rotatable He-Ne laser with a vernier scale and a target plane with a millimeter scale. The parabolic reflector was scanned by the laser beam vertically with known angles and the positions of the reflected beam hit on the target plane were recorded. The deformed angle of the reflective surface was then calculated using these data and the variation of the focal length is finally derived. The surface quality of a prototype Parabolic Trough Concentrator (PTC) was evaluated using this technique at three different positions along the reflector, the testing method developed was found to be acceptable as it produced consistent data over different locations of surface. Deviations up to 90 mm in the focal length were detected using the method and the results revealed that the shape of the parabola of this PTC was significantly deformed in the first quarter of the vertical direction of the shape and the other part is of the acceptable level in view of the large acceptance angle of the Heat Collecting Element (HCE).

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