Jr-Rung Chen et al., J Appl Mech Eng 2017, 6:6(Suppl)
DOI: 10.4172/2168-9873-C1-014

Design and development of a step-gauge calibration system

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A step-gauge, consisting of several short gauge blocks fixed on a base, is widely used in the calibration of machine tools and co-ordinate measuring machines (CMMs). The step-gauge calibration system is developed by comprising a laser interferometer and a CMM. The laser interferometer was used as the standard for traceability of length measurement and designed as a two-path interferometer system to decrease the Abbe error, and then integrated with the high-precision CMM, consisting of the moving platform and probing system to implement the calibration procedure for step gauge.

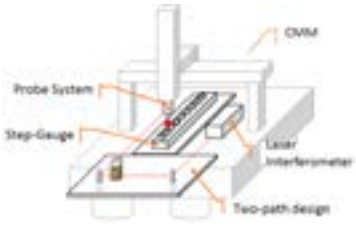

Figure 1: Step-gauge calibration system

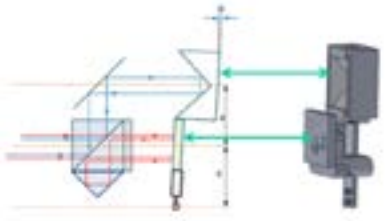

Figure 2: Probe design in two-path interferometer system

Recent Publications

1. Lingard P S, Purss M E, Sona C M and Thwaite E G (1991) Length-bar and step-gauge calibration using a laser measurement system with a coordinate measuring machine. CIRP Annals - Manufacturing Technology doi: 10.1016/S0007-8506(07)62043-5.
2. Hennebelle F, Coorevits T and Vincent R (2017) Optimizing step gauge measurements and uncertainties estimation. Measurement Science and Technology 28(2):025002.
3. ISO/IEC Guide 98-3:2008 Uncertainty of measurement-Part 3: Guide to the expression of uncertainty in measurement (GUM:1995).
4. Bönsch G and Potulski E (1998) Measurement of the refractive index of air and comparison with modified Edlén's formulae. Metrologia 35:133-139.

Biography

Jr-Rung Chen has completed his PhD from the National Taiwan University of Science and Technology. At present, he works at the Center for Measurement Standards of the Industrial Technology Research Institute. He has majored in three-dimensional metrology, precision engineering, and mechatronics.

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