

An Optical Device to Measure the Glass Properties

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Introduction

An optical device has been constructed to determine the properties of a glass sheet such as refractive index and thickness without direct contact. One of the standard methods to determine the refractive index is semicircle shaped glass. But here it is a method to overcome the disadvantages of the previous devices and to provide thickness measuring apparatus which is able to determine the thickness of a transparent workpiece in a high degree of accuracy and more inexpensively, due to its construction

Methodology and Experiments

Laser Light is impinged on the glass to provide a pair of beams reflected from the front and back surfaces of the glass plate respectively. These two points on the front of the device are detected by Pixycam which takes successive photos. These photos are sent to Arduino board which by using different theories in Matlab the characteristics of glass can be obtained by MATLAB program. Then these data are shown on a LED screen. Several glasses have been applied to find the results of this setup successfully.

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وسيله اپتيکی برای اندازه گیری خصوصيات شیشه دستگاه شناسایی ضخامت انواع شیشه و اجسام شیشه ای با استفاده از لیزر و دقت بسیار بالا بدون برخورد با سطح شیشه و بدست آوردن ضخامت از یک طرف شیشه هدف از انجام این پروژه می باشد. توانایی سنجش شیشه با ضخامت ۱ میلی متر تا چندین سانتی متر با استفاده از دوربین پیکسی و برد آردوینو و نمایشگر LCD , برنامه ریزی شده با استفاده از برنامه های MATLAB و ARDUINO تمام آزمایش ها انجام شده و تمام نتایج نمودار بندی شده است. کاربردهای آن در صنعت هواپیما سازی برای تست ضخامت شیشه های هواپیما (پنجره های هواپیما باز نمی شود) و شیشه های آسمان خراش ها (برج ها) می باشد.