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Design of Fresnel lens for uniform LED lighting - Seoyong Shin - Myongji University

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A uniform light diffuser for a light-transmitting diode (LED) light source is a fundamental gadget broadly utilized in lighting designing. We present a straight Fresnel focal point plan for LED uniform light applications. The LED source is a variety of LED. A variety of collimating focal point is applied to collimate yield from the LED exhibit. Two direct Fresnel focal points are utilized to rearrange the collimated pillar along two measurements in the brightening region. Collimating focal point and straight Fresnel focal point surfaces are determined by mathematical optics and non-imaging optics. A collimating focal point has the basic construction of a plano-arched focal point. The direct Fresnel focal point is developed by numerous furrows. The collimated pillar yield from the collimating focal point cluster is isolated into numerous parts comparing to the quantity of Fresnel focal point grooves. Each piece is refracted by a notch and disseminated over the light region, so that complete shaft can be appropriated to the enlightenment target consistently. The planned framework was displayed and recreated with Light. Tools programming to investigate the optical presentation. The reproduction results demonstrate that 82% optical proficiency was accomplished at a consistency of 76.9% for the proposed framework. The recreation of the exhibition of our plan for common sense purposes, for example, indoor and road lighting, and the examination with a customary light source were led. The recreation results show that this plan has a minimal construction, a high optical effectiveness, and a decent uniform dispersion. Some thought on the energy saving and optical execution are talked about by correlation with other regular light sources. The outcomes show that our proposed LED lighting framework is a solid possibility for minimal effort, energy putting something aside for indoor and open air lighting applications.

Lately, LEDs have been utilized in a wide range of fields. With the feature of energy investment funds, long life, and wellbeing for clients LEDs are supplanting other customary lights. In any case, LEDs have weaknesses of a wide pillar point (from 120◦ to 150◦) relying upon the sort of LEDs and have Lambertian appropriations. Light ought to be reallocated utilizing a coordinated essential optical framework or auxiliary optical framework to control appropriation shape and consistency Utilizing freestyle optics is another pattern to plan optional optical parts for LEDs. The benefits of freestyle optics are their interesting plan, minimal size, and exact illumination control In request to plan a freestyle focal point, different techniques have been proposed. For instance, the Miñano bunch built up the synchronous various surface technique (SMS strategy) to plan a collimator for LEDs This technique reallocates light from the source to the intelligent surface to create an equal pillar with a bar point of ±1.5◦ . This technique likewise utilizes a wave-front hypothesis of mathematical optics to plan a Fresnel focal point with joined elements of LED collimation and rearrangement for uniform enlightenment. Wang et al. utilized a light energy planning technique to make a reduced freestyle focal point make an even appropriation in a wide range of shapes likewise, the ideal mathematical strategy can likewise be utilized to configuration free surfaces for LED clusters, for example, in Yu et al. The entirety of the above strategies function admirably in controlling the conveyance shape and delivering a uniform light circulation, however they are not adaptable in various sorts of LEDs. Conditions for focal point surface estimations have boundaries subject to the light source. Along these lines, the focal point structure should be recalculated when applied to various sorts of LEDs

In this part we present the hypothesis of planning a uniform light framework for single LEDs. We propose a novel uniform light framework comprising of three sections: LED, collimator, and two opposite direct Fresnel focal points, as demonstrated as. The collimator was utilized to collimate all light from the LED source. The collimated pillar from the collimator focal point was rearranged utilizing twofold straight Fresnel focal points to give uniform light conveyance over the given objective Commercial collimators are cone-like focal points. We picked a collimator from Led-connect Optics Inc. [8] for our examination. The picture of the business collimator focal point is appeared in Figure 3. Collimators are frequently intended for guide sources and a fixed frequency toward make ideal collimated radiates, while LED chips are typically 1 × 1 mm or bigger. In this way, the yield radiates from the collimator are marginally dissimilar. Subtleties will be introduced in the recreation part. Two fold direct Fresnel focal points made of PMMA with 20 scores each was manufactured utilizing rapid CNC processing. The technique for making the focal points exhibited its ability for high-volume-based assembling. Plan, reproduction, creation, and estimation of twofold direct Fresnel focal points were examined. The accomplished consistency of the reallocated illumination was about 75%, which is reliable with the recreation result. An open air trial of the presentation of our plan for rural lighting and an examination between our light source and a regular light source were directed. It shows our proposed configuration displays extraordinary potential for commercialization.