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Designing and Testing of Led Fixture Body

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Abstract— *LED light Lumina is proposed and experimentally analyzed, which accurately projects light into a large rectangular area to achieve uniform illumination and a high optical utilization factor at the target. Today's businesses are competing increasingly based on delivery time and product quality. Companies cannot survive the competition if they fail to produce good quality products. Thus in order to improve the product quality, some methodology of Designing of LED fixture provides a better option as it aims at improving quality of product.*

A manufacturer company struggling to keep pace with this increasing competition with a fear to lose the future orders because of their larger delivery time was selected for this study. This project is focused on improving quality as well as reducing inventory cost by implementing some methodology of Designing of LED Fixture Body Philosophy.

***Keywords—* asymmetric cryptography, decryption, encryption, key, RSA algorithm.**

I. INTRODUCTION

This project is based on identify and solving the problems in the LED fixture body to increase the productivity and quality industry products. For this purpose, A small scale industry in Vasai East was selected which is known as speciality value lighting and design private limited. It's been a decade company serving to the industries with high quality, specialized and standard led lights. They supply across various states in India directly and indirectly. They are known for prompt delivery of innovative and quality product of light, good customer relationship management.

II. LITERATURE REVIEW

Minseok Ha, Samuel Graham, 2012 [1] in this study conduct a thermal analysis of high power LED packages implementing chip-on-board (COB) architecture combined with power electronic substrate focusing on heat spreading effect. An analytical thermal resistance model is presented for the LED array and validated by comparing it with finite element analysis (FEA) results. In this study, the thermal resistance of high power LEDs implementing COB architecture was analyzed by FEA and analytical analysis. The thermal resistance of LED-array largely depends on the pitch, which is the distance between two adjacent LED-chips, as well as other parameters that mentioned previously. The design shows that LED-chips placed evenly on the heat sink have the lowest thermal resistance and it increases gradually as the pitch decreases The analytical solution derived in this study can provide simple and easy way to find the response with respect to the change of each design parameter.

Heinle, C, Drummer D., 2010 [2] shows in their work, adding thermally conductive fillers to polymers the thermal conductivity can be raised significantly. Thermal conductive polymers (TC-plastics) open up a vast range of options to set up novel concepts of polymer technological system solutions in the area of mechatronics. Heating experiment of cooling ribs show the potential in thermal management of mechatronic parts with TC- polymers in comparison with widely used reference materials copper and aluminum. The results demonstrate that especially for certain thermal boundary conditions comparable performance between these two material grades can be measured. The investigations have shown that, under specific thermal boundary conditions, thermally conductive plastics have a high potential for cooling mechatronic systems. In the area of low to average dissipated energy, if linked to minor degrees of convective cooling, polymers' cooling performance is almost identical to that of metal materials (aluminum or copper). It is thus possible to remove the energy usually dissipated by LEDs, i.e. approx. 0.5 to up to approx. 5 watts, by means of TC-polymer cooling elements. Additional potential may be expected from using ceramic fillers. These materials' heat conductivities are similar to those of the TC- polymers presented; they are electrically insulating.

Chen Jie, at el, 2013 [3] in this study, to solve the heat dissipation problem of LED (light-emitting diode) down light, CFD thermal simulation software was used to establish LED down light dissipation model. Material's thermal conductivity, thermal resistance, thermal emissive values, heat load forms and other factors were all taken in considered, and then numerical simulation combined with laboratory measurement methods was used to analysis the lamp's dissipation. Based on this method, focused on the dissipation effect with different LED quantities and LED ring distances, and then optimized light source layout of current LED down light products. After experimental verification, LED working temperatures were more ideal after the light source layout optimized, and it can improve the LED lamp lifetime effectively, this result also has important practice significance in the future LED down light design process.

LiuYi-bing, 2012 [4] in this paper, using APDL language to generate the analysis file the LED lamp heat sink of finite element model is established. The length, width and numbers of the heat sink fins being design variables; the maximum junction temperature of LED being the objective function, the mathematical model is set up and optimized using ANSYS thermal analysis software. The results show that the longer the length of heat sink fins, the lower the maximum junction temperature of the chip; the wider the fins width, the higher the maximum chip junction temperature; with the increasing of the numbers of fins, the maximum junction temperature will go down; but when reaching a certain value, the junction temperature will slowly increase again. Under the conditions of the LED chip junction temperature not exceeding 60 ℃, the heat sink structure optimized values were: fin length is 62.5mm, fin width is1mm, the number of fins is 20. Using the ANSYS thermal analysis software, this paper exhibits 60W LED illumination lamps and lanterns in array distribution, carries on the thermal analysis and optimizes the heat sink structure. The conclusion has been drawn as following: Heat sink fin length shows approximate linear relationship with the maximum junction temperature, that is to say, the longer the heat sink fins, the lower the maximum junction temperature. The heat sink wing piece width assumes the approximate parabola relations with the maximum junction temperature.

Fig 1: LED Light Fixture Body (Screw Assembly)

III. DRAWBACK OF EXISTING SETUP

- Light leakage between end cap and fixture body.
- Improper edge finishing.
- Loose screw fitting arrangement.

IV. ALTERNATIVE DESIGN

4.1 Sheet Metal Assembly

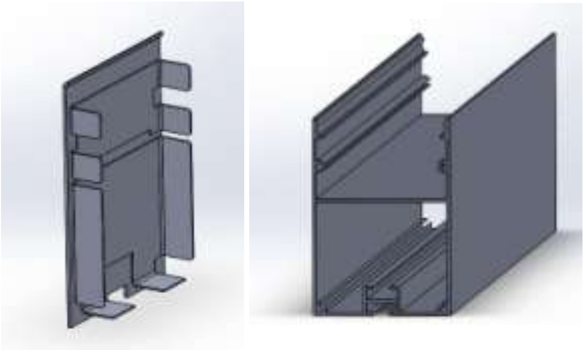

Fig 1.1 Sheet Metal Assembly

Instead of Screw assembly, we can use Sheet Metal assembly which reduce light leakage problem. Also it avoids loose fitting in screw assembly. In these two sheet metal parts are join with glue or with screw fitting to the end cap. But still assembly problem occurs in small amount. So that these Sheet metal type assembly not completes our needs.

4.2 Push-Fit Type Assembly

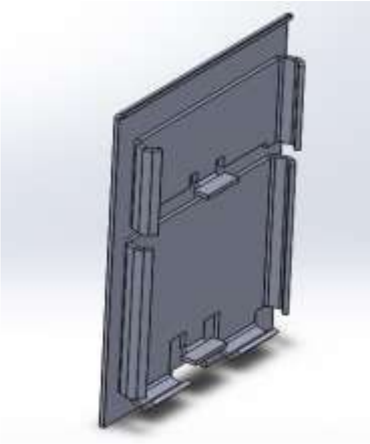

Fig 2.1 Push-fit Type Assembly

Push-fit type assembly is another option for screw assembly. Advantage of it is same which we observe in Sheet Metal type assembly. It reduce light leakage problem, avoids loose fitting. So it completes our need. These type of assembly is perfect for solving all problems occur in LED light fixture. It increase our quality of product due to that our customers are also get satisfy.

V. CONCLUSION

The literature represented in this study describes the designing of LED fixture body. In this study, the major problem faced by the speciality value lighting company is the light leakage at the end of the fixture body and another problem is improper cutting technique and poor material handling method, so we suggested our ideas and designs to bring improvements.

Customer also want the zero-defect product from the company, by implementing our ideas and design, the quality of product gets increase and customer also get satisfy.

REFERENCES

[1] S.Saponara,G.Pasetti,N.Costantino,F.Tinfena,P.D'Abramo, and L. Fanucci, "A flexible LED driver for automotive lighting applications: IC design and experimental characterization," IEEETransactionsonPowerElectronics,vol.27,no.3,pp.1071– 1075,2012.

[2] S. Jang and M. W. Shin, "Thermal analysis of LED arrays for automotive headlamp with a novel cooling system," IEEE Transactions on Device and Materials Reliability, vol. 8, no. 3, pp.561–564,2008.

[3] D.Gacio,J.Cardesin,E.L.Corominas,J.M.Alonso,M.DallaCosta, and A. J. Calleja, "Comparison among power LEDs for automotive lighting applications," in Proceedings of the IEEE IndustryApplicationsSocietyAnnualMeeting,(IAS'08),vol.93, pp.1204–1223,Alberta,Canada,October2008.

[4] I. Takai, S. Ito, K. Yasutomi, K. Kagawa, M. Andoh, and S. Kawahito, "LED and CMOS image sensor based optical wireless communication system for automotive applications," IEEEPhotonicsJournal,vol.5,ArticleID6801418,2013.

[5] S. Y. Jung, S. Hann, and C. S. Park, "TDOA-based optical wireless indoor localization using LED ceiling lamps," IEEE Transactions on Consumer Electronics, vol. 57, no. 4, pp. 1592– 1597,2011.