

1 Production of Customized Electric Powered Table-Led Display 2 using Engraved Plexiglas

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5

6 **Abstract**

7 This paper enunciates the viability and durability of Plexiglas material based on characteristic
8 strength, shatterproof properties and brilliance. The paper explores the suitability of Plexiglas
9 in the display of information in outdoor advertising. Plexiglas is also appropriate for indoor
10 décor because of flexibility, easy to shape and not too sharp edges. The paper utilized
11 Plexiglas as a key material in the production of customized electric powered tableâ???"led
12 display for selected principal officers of Olabisi Onabanjo University Ago-Iwoye. Findings
13 shows that the LED lamp add ambience and aesthetics to the office of the principal officers,
14 Plexiglas material gives durability to the lamp and enhance the allure of its illumination and
15 customization of the souvenirs with images and positions of the university officers celebrates
16 the accomplishments of the individuals.

17

18 **Index terms—**

19 **1 Introduction**

20 lexiglas is a thermoplastic materials also known as acrylic glass or Perspex, often used in sheet form as a lightweight
21 or shatter-resistant alternative to glass. The technical name for this material is polymethylmethacrylate (or
22 PMMA for short), other trade names, such as Perspex, Acrylite, Acrylplast, Lymacryl, Lucite Acrivill, Altuglas,
23 Perclax, Oroglass, Trespex and Vitroflex (Blandino, 2018). However, its original and most famous trade name is
24 Plexiglas. The material was developed in 1928 by chemists, such as William Chalmers, Otto Rohm, and Walter
25 Bauer (Blandino, 2018). Plexiglas is a cost-effective alternative to polycarbonate (PC) when tensile strength,
26 flexural strength, transparency, polish ability and Ultra-Violet (UV) tolerance are more important than impact
27 strength, chemical and heat resistance. Plexiglas materials are viable substitute to glass.

28 **2 Source: mindsetsonline.co.uk**

29 Plate 1: Plexiglas Plexiglas offers tailor-made, durably brilliant solution for information display. This material is
30 mainly used in the signage industry because of its durability and transparency which makes it easy for illumination
31 in signages to shine through even in the dark. It is preferable to glass due to its high transparency, shatterproof
32 and flexible characteristics. Plexiglas is broadly utilized in the advertising industry as a primary material for
33 effective quality signage. Its diverse usage in the outdoor publicity of the physical presence of corporate businesses
34 such as luxury boutiques, financial institutions, shopping malls, eateries, hotels, educational Author ? ?: Ph.D,
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36 abbeymyke@yahoo.com, afeezsegun@yahoo.com institutions and other businesses in an area. It's a solution for
37 beautifying trade show stands or furnishing household apartments. Plexiglas plaques are suitable for offices.
38 Also, it can be used to create directional signages for both indoors and outdoors. The displayed information on
39 Plexiglas fascinate audience by the brilliance sleek, shiny high gloss exterior of the signage. Apparently, Plexiglas
40 appeal to the target audience and creates positive indelible impressions in their minds.

41 **3 a) Engraving of Plexiglas**

42 Engraving is the process of creating print impressions from incised metal plates. The incisions are achieved with
43 the aid of a tool referred to as burin. Impressions are formed from the drawn lines which are artistically marked

12 DISCUSSION

44 on the metal plates. Tones and shading are achieved by making parallel lines or crosshatching. Silver, gold, steel
45 or glass can also be customized through engraving. Engraving is one of the oldest, most popular and important
46 techniques in printmaking. Plexiglas can be engraved manually using burin, the strength required for pressing
47 the tools against the surface is minimal, forceful pressing of burin can cause breakage. Burin, also called graver
48 is the tool used in engraving, it has a metal shaft that is cut diagonally downward to on the ground to form a
49 diamond-shaped point at the tip. The angle of the point of a particular tool affects the width and depth of the
50 engraved lines, the shaft of the tool is fixed in a flat handle that can be held close to the surface being worked
51 on. It also has a wide rounded end for bracing against the palm of the hand while the point is steered by thumb
52 and forefingers. Engraving is categorized into the following:

53 4 i. Intaglio Engraving

54 Grooves or pits are incised into the plate using either a sharp instrument or the action of a strong acid solution
55 (Kelber, 2019). Greasy inks are filled into the depressions, and the surface of the plate are wiped clean. The
56 high pressure of a press enables soft, dampened paper to reach and take on the ink (Kelber, 2019). Basic intaglio
57 processes include etching, engraving, drypoint, and mezzotint.

58 5 ii. Relief Engraving

59 Relief engraving is a more accurate surface printing, the ink is applied on the part left in relief (as in printing
60 from type), while in the former the ink is extracted by dint of great pressure from the engraved lines themselves.
61 Engraving, in its widest signification, is no discovery of the modern world. Goldsmith and metalchaser have
62 flourished amongst almost every cultured people of antiquity of whom we have any knowledge, and the engraved
63 line is one of the simplest and most universal modes of ornamentation in their craft. But there is no evidence
64 that the art was used as a basis for taking impressions on paper before the fifteenth century. However, technology
65 is shaping the techniques and processes in which works of art are made and the art of engraving inclusive.

66 6 II.

67 7 Methodology

68 This research is product development and experimental in design. Eight pieces of round shaped Plexiglas were
69 engraved and fused with an experimental lightning wooden base to create table lamp table souvenirs for the
70 principal management officers of Olabisi Onabanjo University. The procedures of production are classified as
71 follows:

72 8 a) Designing and Editing the Portraits

73 The portraits of the principal officers which are to be printed on the Plexiglas were photographed digital camera,
74 edited and enhanced on both Adobe Photoshop and CorelDraw software installed on the computer system (see
75 Plate 2). The file for engraving was first of all prepared using CorelDraw and was sent to the engraving machine.
76 The outline shape of the Plexiglas, textual information and Olabisi Onabanjo University logotype were also
77 created on CorelDraw graphic package and connected to engraving machine (See plate 3).

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80 10 f) Maintenance

81 The electric powered table top LED display can even be repaired. The top of the base on which the engraved
82 Plexiglas rests have been screwed to the main base which can be unscrewed to reveal the LED strip that lights us
83 the Plexiglas for repairs and replacement of the LED strip in case it somehow get damaged. When this is done,
84 the display stand starts working again. One should ensure that the AC/DC Power is well plugged into power
85 socket and it shows the red power indicator at all time.

86 The lamp should not be plugged directly on its own to the power socket without the adaptor; it will burn the
87 LED strip instantly as it will be taking in more than 12V from the socket and its maximum capacity is 12voltage.

88 11 III.

89 12 Discussion

90 The result of this project shows that, portfolio tag and interior lighting can be put together in a table top
91 multifunctional display stand. Office space management was considered in the conceptualization of this project,
92 hence the project size is 8inches x 3inches, thereby making it easy and comfortable to place in a confined office.
93 It's lightweight and compact miniature structure enhances movability.

94 The importance of energy saving Light emitting diode (LED) bulbs to our lives and environment cannot be
95 over-emphasized. Compared to traditional incandescent, energy-efficient light bulbs such as halogen incandescent,

96 light emitting diode LED) are becoming more preferable. It typically use about 25%-80% less energy than
97 traditional incandescent bulbs. It is cost effective and easy to produce. LED light does not generate heat like
98 other conventional incandescent bulbs, it is also not weighty and illuminates brightly. The lamp is durable and the
99 inbuilt lightning can light up to 150,000 hours, their materials are less brittle and require minimal maintenance.

100 Plexiglas is very strong glass-like material that is shatter-proof when it is accidentally dropped and it does not
101 easily suffer abrasion except sharp object is purpose used against it. It can withstand any kind of weather and
102 the thickness used for this project makes it difficult to break even when one tries to bend it.

103 IV.

104 **13 Findings**

105 i. The LED lamp add ambience and aesthetics to the office of the principal officers. ii. Plexiglas material gives
106 durability to the lamp and enhance the allure of its illumination. iii. Customization of the souvenirs with images
107 and positions of the university officers celebrates the accomplishments of the individuals. iv. The lamp does not
108 generate extreme heat and it is shock proof. v. The lamp is compatible, movable and suitable for office décor.

109 V.

110 **14 Conclusion**

111 Souvenirs are items of value given to people held in high esteem. Plexiglas made souvenirs are premium and high-
112 end. The luxuriant features of Plexiglas makes it suitable for diverse purposes inclusive of souvenirs. Transparency
113 and clarity of the material add brilliance to lamp illumination. Plexiglas is durable to withstand extreme pressure
114 and heat emitting from the lamp lightening. It is break-resistant and display colours in its distinctness. The
115 illumination from the developed table lamp radiates an ambience of aesthetics when viewed. Laser cutting and
116 Plexiglas engraving is an emerging technique of printing that is ¹

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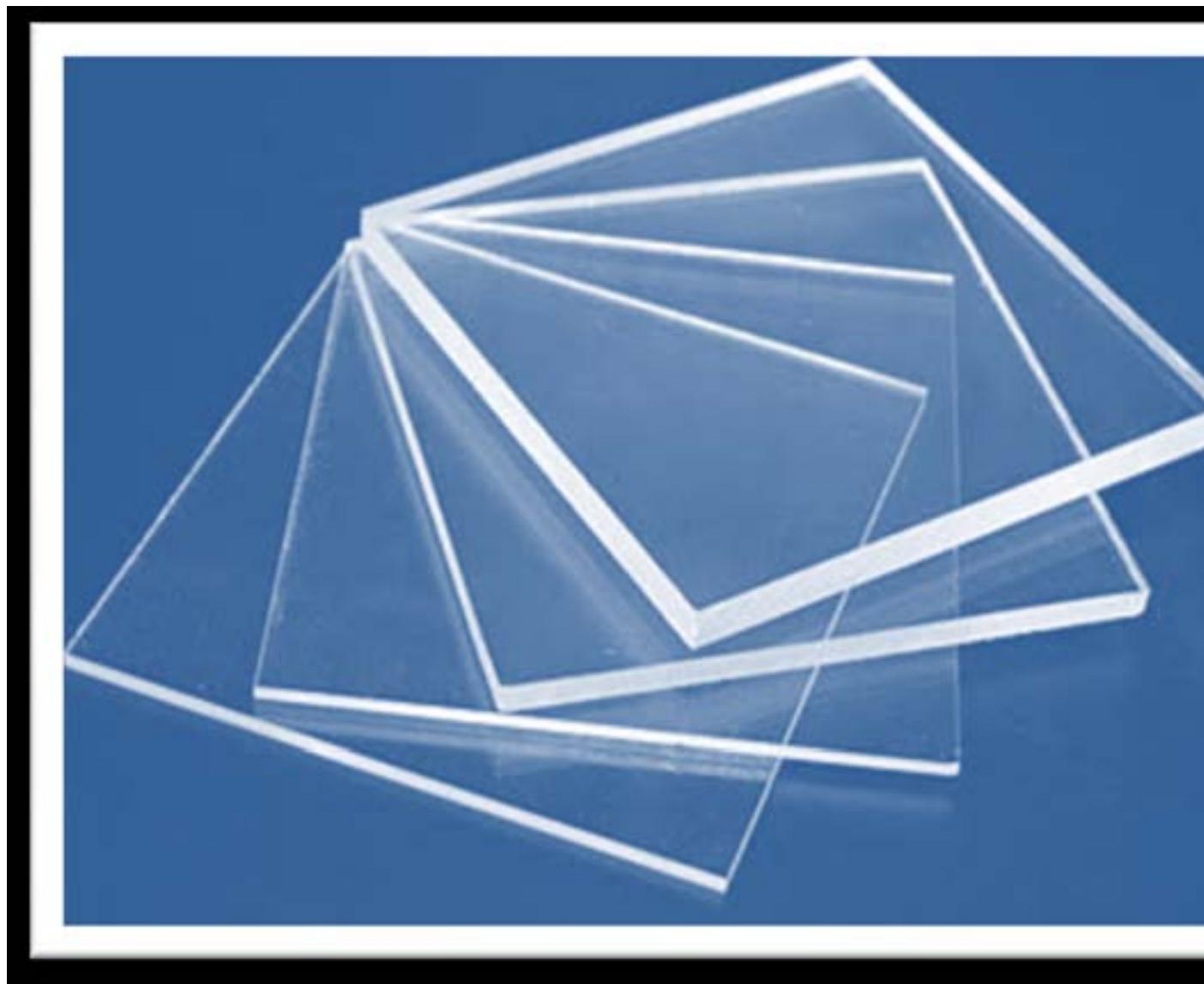


Figure 1:

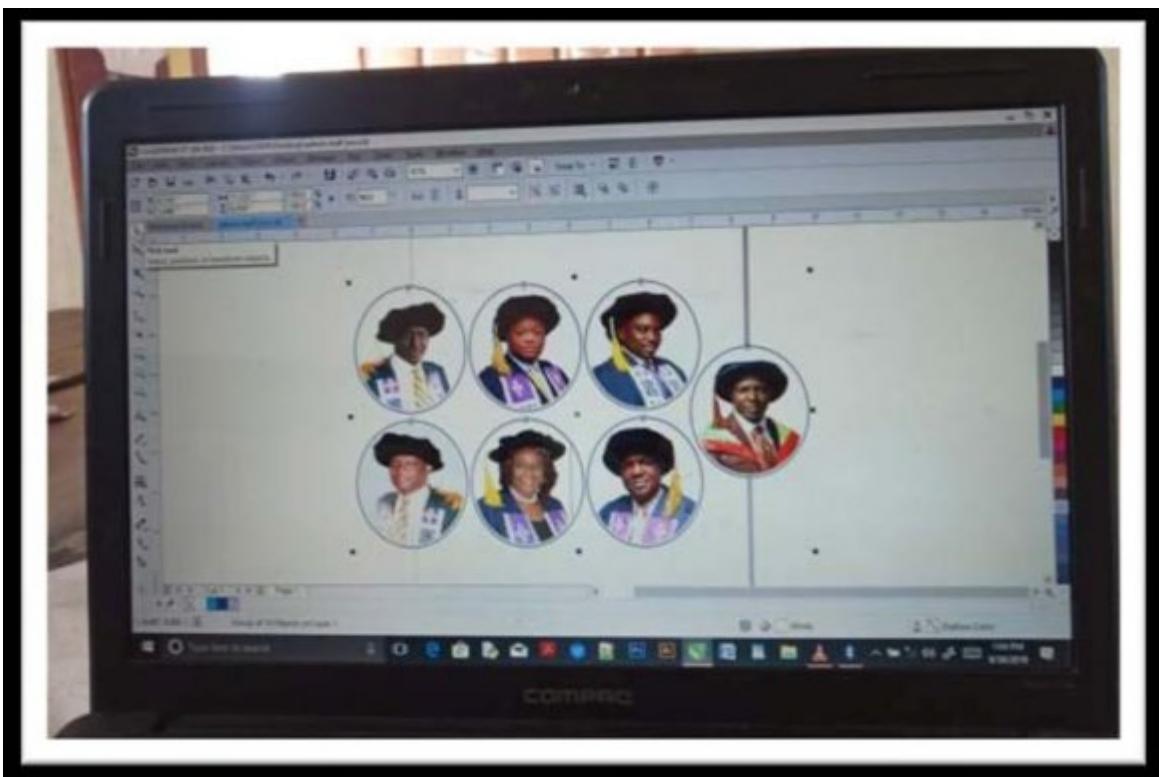


Figure 2: Plate 3 : 1 :

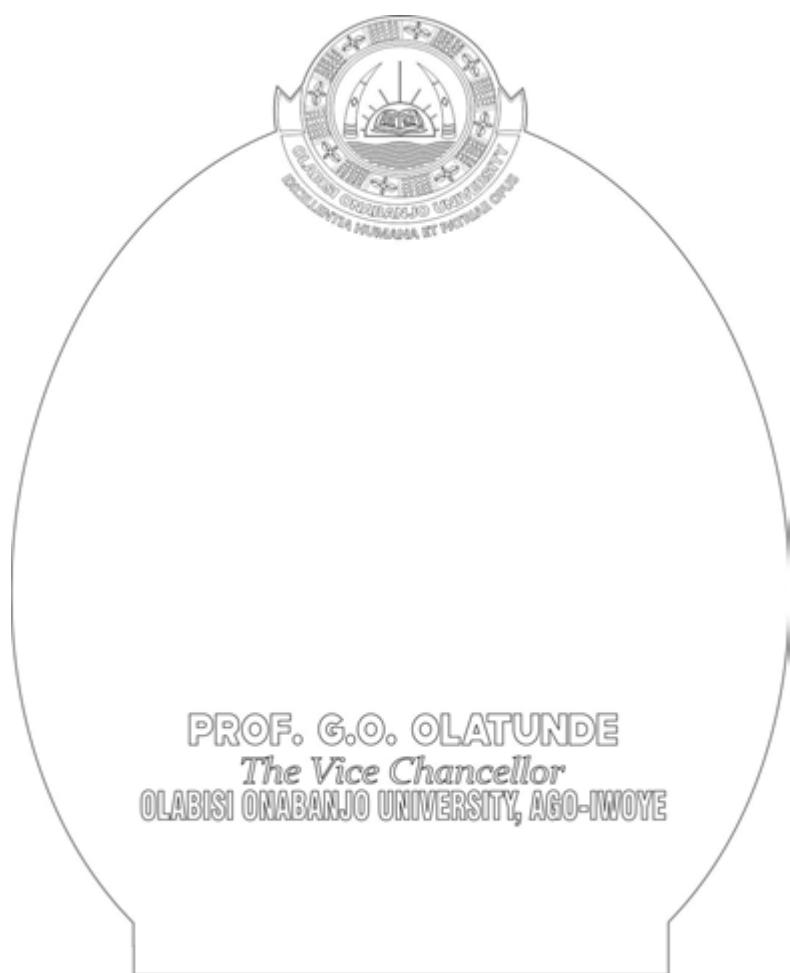


Figure 3:



Figure 4:



Figure 5:



Figure 6:

117 to smoothen the surfaces and blunt the edges of the cut plywood. The plywood were joined together with
118 gum (see plate 7). The LED strip with lightning bulbs were soldered to the wire passed and connected to the AC
119 power adaptor affixed into the base of the plywood casements of the seven lamps (see Plate 8 and Plate 9). The
120 LED strips were tested one after the other before proceeding to the next stage (See Plate 10). After installing
121 the LED strip, the base was wrapped with the reflective Navy Blue geometric-patterned leather (See Plate 12).
122 Navy blue acrylic paint was applied to the portion where the names of the principal officers have been engraved
123 on the Plexiglas, masking out other exposed area to prevent staining.

124 .1 e) Testing

125 The LED multifunctional table top display was tested after coupling it. The scratch-proof paper

126 [Mindset (2018)] *Plexiglass image*. Retrieved from *mindsetsonline*, Mindset . 2018. 12/11/2019.

127 [Kelber ()] *Print Making Processes: Relief and Intaglio*, S Kelber . <https://blog.bookstellyouwhy.comon24/12/2019> 2019.

129 [Blandino ()] *What is Plexiglas? The alternative to glass that's perfect for printing*, G Blandino . 2018.
130 23/12/2019.