

# Development of Ergonomically-Based Rotary Lightbox for Outdoor Advertising Media

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**Abstract.** Out-of-home/OOH digital advertising market reach increased by 62.3% compared to the previous year and expanded the total advertising market. The target or aim of this research is to develop a rotary lightbox as an outdoor advertisement with an ergonomic approach so that the advertising media meets the security and safety of users (the public). The sample of users used is the academic community of the Makassar PSDKU Politeknik Negeri Media Kreatif. The development method used is the R&D (Research and Development) method with the main focus on the use of ergonomic standards including visual design (typography size and color), anthropometry, and the physical environment (lighting). The conclusion of this research is an ergonomic outdoor advertising media design with a visual distance of 12,000 mm or 12 m with media dimensions of 150 cm x 30 cm, namely Cap Height, Cap Width and Tracking sizes, namely 60 mm, 10 mm and 3 mm. This is in accordance with field tests with 34 respondents who observed the results of Grandjien Application being 51.8% and 43.6% respectively and Color Standard Application results being 34.4% and 48.8% respectively.

**Keywords:** Rotary Lightbox, Ergonomics, Outdoor Advertising.

## 1 Introduction

One type of advertising that is rarely researched is space advertising or what is called OOH Advertising. Out-of-home (OOH) advertising is an important and prominent component of many advertising campaigns, but the medium remains under-researched, and scientific research is highly fragmented [1]. Further research is needed regarding outdoor advertising.

According to the 2019 advertising industry survey, the digital out-of-home (OOH) advertising market area increased by 62.3% compared to the previous year and expanded the total OOH advertising market [2]. Other research also found that there were advertising and selling interventions self, the increase in sales volume was 77.2% while the remaining 22.8% was influenced by other factors [3].

OOH advertising media has entered the digital era with the reach of digital screens to consumers anytime and anywhere in physical space [4]. Even though its reach is not as big as that of electronic and print, outdoor media is enough to divert the attention of people who see the media and is more interesting because of its visual nature [5]. It is also known that almost half of OOH campaigns are aimed at brand positioning (n = 21; 27%) and creating positive attitudes (n = 17, 22%) [6].

A collection of ad recall research from 2017 to 2022, shows that out-of-home advertising produces significantly higher ad recall among consumers than live and streaming television,

podcasts and radio, print media, and online execution [7]. Advertising keeps company branding fresh in consumers' minds [8]. There are 62% of respondents who feel that OOH outdoor advertising helps recall an advertising message and with the right approach it will significantly increase the recall value of the message/information [9].

The use of OOH as an outdoor advertising medium that interacts with humans must of course take into account the human side as the recipient of the message. Requirements for safe outdoor advertising include not being at intersections and having good lighting levels at night and using an ergonomic approach. One type of OOH that is now widely used is a light box and needs to be developed with an ergonomic approach.

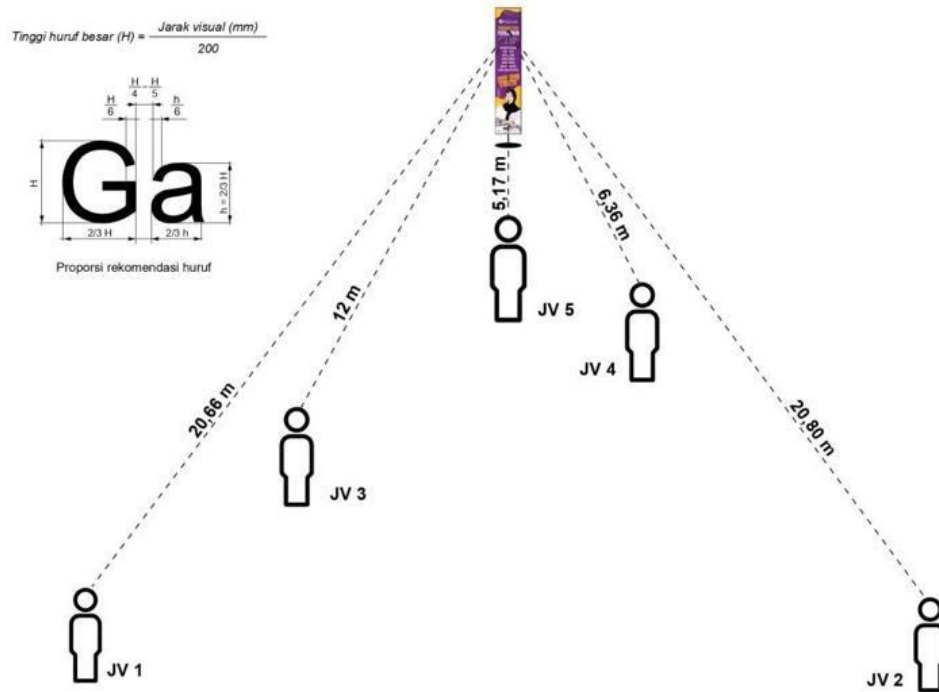
This research will examine in detail the application of OOH, especially lightboxes, targeting students and other academics. The findings reveal that most teenagers perceive OOH media as a catalyst media between traditional media such as newspapers, magazines and digital. When considering the academic perspective on OOH advertising media it is seen that the main OOH advertising media platforms are developing and the development has been consistent since the past [8].

## **2 Methodology**

### **2.1 Material**

Product development and due diligence of outdoor advertising media involves a systematic approach to creating and broadcasting innovative and practical advertising solutions. This process begins with the conceptualization of a new media format, which aims to attract the audience's attention and improve ergonomic understanding of the message. During product development ensures, various design elements are considered for a visually appealing and functional medium. Feasibility testing then assesses the practicality of these solutions, by examining factors such as visibility. By conducting thorough testing, advertisers can determine how well media performs in real-world conditions and make informed decisions regarding its implementation, ensuring that it meets creative and ergonomic requirements. Product development and feasibility testing were carried out on the following:

There are five visual angle used and incorporated into the formula for the application of ergonomically-based outdoor advertising media. The standard formula used is letter size measurement based on Grandjean's application. Grandjean's application helps in determining font size that supports user comfort and readability of outdoor advertising. Among the five visual angle, one will be selected that matches the dimensions of the rotary lightbox media.



## 2.2 Methods

The research approach used in this study is a research and development (R&D) approach with a 4D flow (define, design, development, and dissemination) which has the aim of producing a product and then testing the feasibility of the product. The research stages can be explained in a flow starting from data collection through literature study and interviews, planning through brand insight, segmentation and mind mapping so that you can produce work concepts that can be realized in the production department, Initial product development through creating advertising materials. Product development begins with media design, especially measuring the ideal letters according to the dimensions of the rotary lightbox media, namely 150 x 30 cm. Visual distance is assessed most often. Letter measurements use the Grandjean formula, namely

$$\text{Cap Height (H)} = \frac{\text{Visual Angle (mm)}}{200} \quad (1)$$

$$\text{Cap Height (H)} = \frac{12,000}{200}; \quad (2)$$

$$\text{Cap Width} = \frac{H}{6} \quad (3)$$

$$\text{Cap Width} = \frac{60}{6} = 10 \text{ mm}; \quad (4)$$

$$\text{Tracking} = \frac{H}{4} - \frac{H}{5} \quad (5)$$

$$\text{Tracking} = \frac{60}{4} - \frac{H-60}{5} = 3 \text{ mm} \quad (6)$$

An illustration of the use of proposed letters is as follows:



**Fig. 2.** Design Results for Media Font Measurements according to Rotary Lightbox Media Dimensions

After getting the ideal letters and the use of colors that are considered based on ergonomics. The next step is preliminary testing through media curators, implementation of product revisions (main product), field testing through user testing with a total of 34 observers as respondents. The final step is implementation of product (operational product) revisions as the final part/finishing of the product.

### 3 Result and Discussion

**Table 1.** User Perception of Outdoor Advertising Media According to Grandjean's Application

Indicator	Scale (%)				Total %
	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	
Non Glare Lighting	56	43	1	0	100
Legible Typography	53	41	6	0	100
Image Clarity	56	39	2.5	2.5	100
Contrast Sensitivity	38	56	6	0	100
Optimal Visual Angle	56	39	2.5	2.5	100

Based on table 1 above, it can be seen that the average percentage of the scale of strongly agree and agree with the perceptions of 34 observers of Outdoor Advertising Media (Rotary Lightbox) using the Grandjien Application is 51.8% (n=34) and 43.6% (n=34) respectively. The remaining accumulation of doubts and disagreements is 4.6% (n=34)

**Table 2.** User Perception of Outdoor Advertising Media According to Color Standards

#### Application

Indicator	Scale (%)				Total %
	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	
Contrast Color	42	53	2.5	2.5	100
Less than 5 colors	30	56	7	7	100
Warm Color Effect	35	53	3	9	100
Neutral Color Effect	31	52	8.5	8.5	100
Cool Color Effect	33	45	7	15	100
Proximity Effect	38	41	9	12	100
Distance Effect	32	41	6	18	100

## 4 Conclusion

Based on the findings of this research, it is known that with a visual distance of 12,000 mm or 12 m, a proposed design for ergonomic-based rotary lightbox outdoor advertising media with dimensions of 150 cm x 30 cm is obtained, namely Cap Height, Cap Width and Tracking sizes, namely 60 mm. , 10mm, and 3mm. This is in accordance with the field test with 34 respondents who observed the results of the application of Grandjien respectively being 51.8% and the remaining 43.6% the accumulation of doubts and disagreements namely 4.6% and the application of color standards respectively being 34.4% and the remaining 48.8% the accumulation of doubts. doubt and disagree, namely 16.8%

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