

Documents

Semadi, H.F., Ayob, M.F.

IMPROVING ROAD SAFETY AT ACCIDENT-PRONE AREAS: A COMPARISON BETWEEN GLOW-IN-THE-DARK AND CONVENTIONAL ROAD MARKING

(2024) *Planning Malaysia*, 22 (5), pp. 510-526.

DOI: 10.21837/pm.v22i34.1605

Department of Quantity Surveying, Kulliyyah of Architecture and Environmental Design, International Islamic University, Malaysia

Abstract

Driving at night is challenging due to poor vision, poor road visual guidance, and the need to encounter bright light sources. Factors like lack of street lighting, fading, and lack of reflectivity by road studs and retro-reflective materials affect road users' vision at night. Commentators have pointed out there is a critical demand to improve road safety in preventing road accidents and hazards that caused by the poor visibility of road markings and inadequacy lighting. Although road safety management has been given an important focus by the Ministry of Transportation Malaysia to achieve 50% reduction of road accidents by 2030, there is a critical demand to improve the present road markings method to overcome the issues of poor visibility or unclear road markings and inadequacy lighting that may trigger potential hazards to road users at night, with a new innovative road marking technology. Therefore, this paper is prepared with the objective to present the outcome of comparative study between the present conventional road markings and the newly innovative technology of glow-in-the-dark method with specific reference to the road safety management in Malaysia. This study employed a questionnaire survey to interview fifty-one (51) respondents that have experience of driving at night, with the objectives to get their opinions on present condition of road markings in Malaysia, and how the newly innovative technology glow-in-the-dark can improve road safety in Malaysia. The study outcome revealed that the glow-in-the-dark is deemed appropriate to enhance the visibility during low-light conditions as compared to the present conventional road markings. Although the initial cost is higher, the economic advantages of glow-in-the-dark in reducing the streetlight usage, lower electrical costs, and substantially extended lifespan have made this newly innovative road marking outweighed the downsides and economically wise choice to revolutionize road safety management practice at the accident-prone areas in Malaysia for achieving the SDG 3: Good Health and Well-being. © 2024 by MIP.

Author Keywords

Condition; Cost; Glow-in-the-dark; Road markings; Road Safety

References

- Ackaah, W., Apuseyine, B. A., Afukaar, F. K.
Road traffic crashes at nighttime: Characteristics and risk factors
(2020) *International Journal of Injury Control and Safety Promotion*, 27 (3), pp. 392-399.
- Ayob, M. F.
(2014) *Development of Life Cycle Cost Strategy and Protocol on Cost Data Input in Malaysia*,
Unpublished doctoral dissertation for Doctor of Philosophy (Built Environment),
International Islamic University Malaysia
- Babić, D., Babić, D., Fiolic, M., Ferko, M.
Road markings and signs in road safety
(2022) *Encyclopaedia*, 2 (4), pp. 1738-1752.
- Bacero, R., To, D., Arista, J. P., Cruz, M. K. D., Villaneva, J. P., Uy, F. A.
Evaluation of strontium aluminate in traffic paint pavement markings for rural and unilluminated roads
(2015) *Journal of the Eastern Asia Society for Transportation Studies*, 11, pp. 1726-1744.
- Harian, Berita
Kos garisan jalan 'glow in the dark' hampir 20 kali ganda kaedah konvensional,
(6th January 2024). Retrieved on 27 January 2024 from

- Bhujbal, S. A., Bhosure, A. G., Sonawane, G. S., Patel, P. R., Jadhav, V. R., Dhivare, J.
Study smart road with glowing lines
(2022) *International Journal for Research in Applied Science and Engineering Technology*, 10 (4), pp. 3238-3241.
- (2020) *Road marking materials – Paint, thermoplastic and cold plastic materials – Physical properties (BS EN 1871:2020)*, pp. 1-43.
BSI Standard Limited
- Burghardt, T. E., Ettinger, K., Köck, B., Hauzenberger, C.
Glass beads for road markings and other industrial usage: Crystallinity and hazardous elements
(2022) *Case Studies in Construction Materials*, 17, pp. 1-14.
- Burghardt, T. E., Maki, E., Pashkevich, A.
Yellow thermoplastic road markings with high retro-reflectivity: Demonstration study in Texas
(2021) *Case Studies in Construction Materials*, 14, pp. 1-13.
- Burghardt, T. E., Pashkevich, A., Wenzel, K. M.
A study of premium glass beads for road marking materials
(2021) *Roads and Bridges-Drogi i Mosty*, 20 (2), pp. 125-138.
- Burghardt, T., Pashkevich, A.
Materials selection for structured horizontal road markings: Financial and environmental case studies
(2020) *European Transport Research Review*, pp. 1-10.
- Deepashree, R., Radhika, K. N.
Ways to avoid traffic congestion in India and make India smarter - A prelude
(2020) *International Journal of Engineering Research & Technology*, 8 (11), pp. 310-314.
- Dormidontova, T. V., Filatova, A. V.
Research of influence of quality of materials on a road marking of Highways
(2016) *Procedia Engineering*, 153, pp. 933-937.
- Fellows, R., Liu, A.
(2008) *Research Methods for Construction*,
Oxford, UK: Wiley-Blackwell
- Grobbelaar, S. S.
(2007) *R&D in the National system of Innovation: a system dynamics model*,
Published doctoral dissertation, Faculty of Engineering, Built Environment and Information
Technology, University of Pretoria, South Africa
- Harun, M. H., Omar, R.
Kajian penggunaan perabot jalan raya dalam mengurangkan kemalangan jalan raya di Selangor, Malaysia
(2022) *Research in Management of Technology and Business*, 3 (1), pp. 676-699.
- Harun, M. H., Rosdi, S., Rosmani, M.
High performance thermoplastic and cold applied plastic road markings: How long do they last?
(2019) *IOP Conference Series: Materials Science and Engineering*, 512, pp. 1-12.
012002
- (2020),
Retrieved May 13, 2023. Shipping from China to Malaysia
- (2023) *The Longest Glow in the Dark Road Markings is Now Found in Kedah*,
(3 December). Retrieved on 27 January 2024 from

- Linggi, Alexander Nanta
Malaysia's Works Minister,
(16th November 2023)
- (n.d.a). Retrieved May 13, 2023. Aashto M247 Type2 standard glass beads for road marking from Chinese manufacturer
- *Glass beads for road marking paint from China factory*,
(n.d.b). Retrieved May 13, 2023
- *Professional ocean shipping agent 20/40FT FCL from Shanghai to Malaysia*,
(n.d.c). Retrieved May 13, 2023
- *Jambatan Sungai Masai Kini Miliki 'Roadline Glow in The Dark' Pertama Di Johor*,
Retrieved on 27 January 2024 from
- *31 Lokasi Bakal Guna 'Glow in The Dark'*,
(5th January 2024). Retrieved on 27 January 2024 from
- (2022) *Pelan Keselamatan Jalan Raya Malaysia 2022-2030*, pp. 1-68.
- Mohamed, M. M.
(2019) *Evaluation and modelling of pavement marking characteristics based on laboratory and field data*, pp. 1-156.
University of Idaho
- Munikanan, V., Peng, N. C., Yahya, M. A., Yusof, M. A.
Strontium Aluminate Compound as Road Line Materials Application
(2021) *Jurnal Kejuruteraan*, 4 (2), pp. 17-21.
- *JKR Hulu Langat implements innovative pilot project: "Glow in the Dark" road paint*,
New Straits Time (NST) (16 November 2023a). Retrieved 27 January 2024 from
- *Glow-in-the-dark paint: More road tests needed [NSTTV]*,
(11 December 2023b). Retrieved on 27 January 2024 from
- Pavalarathinam, P., Satheesh, H., Vinoth, M., Vishnubabu, D.
(2012) *Invention of fluorescent pavement*, pp. 1-32.
Anna University of Technology Tiruchirappalli
- (1988) *Standard specification for road works*, pp. 1-270.
Cawangan Jalan
- (2017) *Manual on traffic control devices: Temporary signs and work zones control*, pp. 1-135.
(JKR 20400-0205-17). Cawangan Jalan
- (2017) *Standard specification for road works: Section 6: Road furniture (JKR 20400-0106-17)*, pp. 1-33.
Cawangan Jalan
- **Standard specification for road works: Section 19: Traffic management at work zones**
(2019) *Cawangan Jalan*, pp. 1-53.
- **Jadual kadar kerja kejuruteraan awam dan bangunan 2021 (JKR 20800-0236-21)**
(2021), pp. 1-137.
Public Works Department (PWD) Malaysia Cawangan Kontrak & Ukur Bahan
- (2023) *Jadual kadar kerja elektrik 2023 (JKR 20300-0113-23)*, pp. 1-146.
Cawangan Kejuruteraan Elektrik

- Sakhapov, R. L., Kashipov, R. F., Gatiyatullin, M. H.
Exploring the effect of thermoplastic composition on light emission
(2020) *IOP Conference Series: Materials Science and Engineering*, 786 (1), pp. 012058-7.
1
- Saleem, M., Hosoda, A.
Development and testing of glow-in-the-dark concrete based raised pavement marker for improved traffic safety
(2021) *Journal Of Civil Engineering and Management*, 27 (5), pp. 278-287.
- Sha, A., Liu, Z., Jiang, W., Qi, L., Hu, L., Jiao, W., Barbieri, D. M.
Advances and development trends in eco-friendly pavements
(2021) *Journal of Road Engineering*, 1, pp. 1-42.
- Stamatiadis, N., Psarianos, B., Apostoleris, K., Taliouras, F., Montella, A., Garofoli, G.
A case for differentiating design consistency evaluation between day and night
(2020) *Transportation Research Procedia*, 45, pp. 643-650.
- *Glow-in-the-dark markings spark buzz*,
Retrieved 1 February 2024 from
- *Malaysia rolls out first glow-in-the-dark road markings*,
(16th November 2023). Retrieved 27 January 2024 from
- (2018) *The 2030 Agenda and the Sustainable Development Goals: An opportunity for Latin America and the Caribbean (LC/G.2681-P/Rev.3)*, 1-94,
Santiago
- Wenzel, K. M., Burghardt, T. E., Pashkevich, A., Buckermann, W. A.
Glass beads for road markings: Surface damage and retroreflection decay study
(2022) *Applied Sciences*, 12 (4), pp. 1-21.
- *Johor's 1st Glow in the Dark Road Lines Installed in Masai, Will Be Expanded State-Wide in 2024*,
Retrieved on 27 January 2024 from
- *Johor MB: Glow-in-The-Dark Markings Will be Used at 31 Roads in The State*,
Retrieved on 27 January 2024 from

Correspondence Address

Ayob M.F.; Department of Quantity Surveying, Malaysia; email: fairullazi@iium.edu.my

Publisher: Malaysian Institute Of Planners

ISSN: 16756215

Language of Original Document: English

Abbreviated Source Title: Plann.Malays.

2-s2.0-85206297372

Document Type: Article

Publication Stage: Final

Source: Scopus

ELSEVIER

Copyright © 2024 Elsevier B.V. All rights reserved. Scopus® is a registered trademark of Elsevier B.V.

 RELX Group™