

Documents

Mamat, A.F.^a, Amin, M.F.M.^a, Mahmood, J.^a, Hamid, M.A.H.A.^a, Hussain, M.R.M.^b, Tukiman, I.^b, Muda, R.S.^a

Site Selection Study of Siren Early Warning System for Community Preparedness due to Potential Dam Calamity: Case Study of Kg Batu Melintang, Jeli, Kelantan

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^a Unit of Civil & Geoinformatics, Department of Generation & Environment, TNB Research Sdn Bhd, Malaysia

^b Kulliyyah of Architecture and Environmental Design, International Islamic University of Malaysia, Malaysia

Abstract

Effective early warning systems (EWS) for dam disasters rely heavily on the strategic placement of sirens to ensure comprehensive coverage and timely alerts. This study investigates the criteria and methodologies for optimizing siren placement, utilizing Geographic Information System (GIS) technology and multi-criteria decision analysis. By integrating data on population density, geographic features, and flood hydrodynamics, the study identifies optimal siren locations to maximize effectiveness. Population data from recent census reports, geographic data from topographic maps and satellite imagery, and disaster simulation data were analysed to determine high-risk areas and prioritize siren placement. The results demonstrate that strategic placement of sirens with standard coverage radius of up to 1 kilometre can significantly enhance early warning capabilities, even in areas prone to flooding, provided they are strategically placed in densely populated zones. The findings highlight the importance of data-driven site selection in improving disaster preparedness and risk management strategies, ultimately contributing to more effective early warning systems that safeguard lives and property in vulnerable communities. © 2025 Institute of Physics Publishing. All rights reserved.

References

- Yang, J.
Study on the Disaster Mechanism Analysis and Enlightenment of Dam Failure
(2023) *Highlights Sci. Eng. Technol*, 75, pp. 186-191.
- Tipol, F., Sutimin, S., Razak, K.
(2024) *Evacuation Time Estimation for Flood Event Under Hypothetical Total Dam Breach Scenario Using Weibull Distribution: Case Study for Batang Ai Hydroelectric Plant*, pp. 629-641.
- Fish, B. E.
The Forgotten Legacy of the Banqiao Dam Collapse - Economic Observer Online - In-depth and Independent The Forgotten Legacy of the Banqiao Dam Collapse - Economic Observer Online - In-depth and Independent The Forgotten Legacy of the Banqiao Dam Collapse
(2013) *Economic Observer*, pp. 1-3.
- Silva Rotta, L. H.
The 2019 Brumadinho tailings dam collapse: Possible cause and impacts of the worst human and environmental disaster in Brazil
(2020) *Int. J. Appl. Earth Obs. Geoinf*,
- Mamat, A. F., Amin, M. F. M., Kamal, N. S., Muda, R. S., Hussain, M. R. B. M., Tukiman, I. B.
Dam Safety Evacuation Planning for Community Downstream of Pergau Dam, Jeli, Kelantan (Case Study of Kg Batu Melintang)
(2023) *Water Resour. Dev. Manag*, pp. 115-129.
Part F2265
- Heyns, A., du Plessis, W., Curtin, K., Kosch, M., Hough, G.
Decision support for the selection of optimal tower site locations for early-warning wildfire detection systems in South Africa

(2020) *Int. Trans. Oper. Res.*,
Dec

- Dixon, N., Smith, A., Pietz, M.
A community-operated landslide early warning approach: Myanmar case study
(2022) *Geoenvironmental Disasters*, 9 (1).
- Rahmati, O.
GIS-based site selection for check dams in watersheds: Considering geomorphometric and topo-hydrological factors
(2019) *Sustain*, 11 (20).
- Munro-stasiuk, M.
A Gis-Based Approach To Analyzing Warning Siren Networks: an Analysis of Riley and Wabaunsee Counties, Kansas
(2006) *Pap. Appl. Geogr. Conf*, 29, pp. 186-195.
February
- Goto, H., Murray, A.
Acoustical properties in emergency warning siren coverage planning
(2020) *Comput. Environ. Urban Syst*, 81.
May
- Khairusalleh, K.
(2010) *Kg Batu Melintang.pdf*,

Correspondence Address

Mamat A.F.; Unit of Civil & Geoinformatics, Malaysia; email: fadhli.mamat@tnb.com.my

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