Scopus

## Documents

Hasbollah, D.Z.A.[a] , May, B.S.[d] , Romanah, N.A.[a] , Taib, A.M.[b] , Ramli, A.B.[c] , Rahman, N.A.[b] , Sait, K.N.M.[d] , Jusoh, S.N.[d]

**Comparative study of landslide cases in Malaysia: Lesson learnt**
(2021) *Journal of Mines, Metals and Fuels*, 69 (8), pp. 166-173.

[a] Centre of Tropical Geoengineering, Universiti Teknologi Malaysia, Johor, Malaysia
[b] Department of Civil Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, Malaysia
[c] Civil Engineering Department, Kulliyyah of Engineering, IIUM Gombak, Malaysia
[d] School of Civil Engineering, Universiti Teknologi Malaysia, Malaysia

**Abstract**
Landslide events have the devastating impacts on human lives, damage to the physical asset (building, roads and highways), broken of utility supply lines and loss of environmental resources and economic costs. In the period of 59 years from 1961 to 2019, Malaysia has recorded 91 distinct landslide events which caused 721 deaths. Urbanization and the high rate of population growth accelerate the construction of flat ground. In order to cater to this demand, land utilization becomes more important and generally shifts toward the hilly area or expands underground. This paper presents the comparative studies between 4 landslide cases to come out with the most common causal factors and rehabilitation methods taken. Studies showed that landslides occurred in Malaysia is mainly due to the intense and prolonged rainfall event. Since Malaysia is experiencing tropical weather, frequent and intense rainfall event is unavoidable. Therefore, the impact of rainfall shall be considered and included in the design to minimize the risk of landslide. Besides, human factors such as deforestation, design error and construction error should also be reviewed to effectively prevent the occurrence of the landslide. 

**Author Keywords**
Clay; Geological hazard; Landslide; Soil profile; Weathering

**References**

- Thanapackiam, P., Khairulmaini, O.S., Ghaffar, F.A.
**Space-Time Behavior of Klang Valley Region Slope Failures**
(2012) *Sains Malaysiana*, 41 (12), pp. 1613-1620.
- Broms, B.B., Wong, I.H.
(1985) *Stabilization of Slopes with Geofabric*, pp. 75-83.
Third International Geotechnical Seminar on Soil Improvement Methods, Singapore
- (2006) *Stability Analysis and Stability Chart for Unsaturated Residual Soil Slop. American Journal of Environmental Sciences*, pp. 154-160.
- Varnes, D.J.
(1958) *Landslide Types and Processes*, pp. 20-47.
Washington, Special Report 29
- Varnes, D.J.
**Slope Movement Types and Processes. Landslides: Analysis and Control. National Academy of Sciences, Washington**
(1978) *Special Report*, 176, pp. 11-33.
- Kazmi, D., Qasim, S., Harahap, I., Baharom, S., Imran, M., Moin, S.
**A Study on the Contributing Factors of Major Landslides in Malaysia**
(2016) *Civil Engineering Journal*, 2 (12), pp. 669-678.

- Cruden, D.M.
  **A simple definition of a landslide**
  (1991) *Bulletin of the International Association of Engineering Geology*, 43 (1), pp. 27-29.

- Cruden, D.M., Varnes, D.J.
  **Landslide Types and Processes. Transportation Research Board, U.S. National Academy of Sciences**
  (1996) *Special Report*, 247, pp. 36-60.

- Gul, F.A., Islam, M.R., Rahman, W.
  **Highland Towers Collapsed", The Tragic Story of Malaysia**
  (2017) *International Journal for Research in Social Science and Humanities*, 3 (2), pp. 10-19.

- Rahman, H.A., Mapjabil, J.
  **Landslides Disaster in Malaysia: An Overview**
  (2017) *Health and the Environment Journal*, 8 (1), pp. 58-71.

- Niroumand, H., Kassim, K.A., Ghafooripour, A., Nazir, R.
  **The Role of Geosynthetics in Slope Stability**
  (2012) *Electronic Journal of Geotechnical Engineering*, 17, pp. 2739-2746.

- *Jabatan Kerja Raya (JKR) (2010): Guildelines for Slope Design*,
  Malaysia

- **National Slope Master Plan. Sectoral Report Research and Development**
  (2009) *Jabatan Kerja Raya Malaysia*,

- Osman, K., Kasim, N., Mohd Yusof, M.A.
  **Landslide Investigation: A Case Study of the Landslide in Bukit Nanas Forest Reserve, Kuala Lumpur, Malaysia**
  (2014) *World Landslide Forum*, 3, pp. 1-5.
  Beijing

- Terzaghi, K.
  **Mechanism of Landslides**
  (1950) *Application of Geology to Engineering Practice*, pp. 83-123.
  Geological Society of America

- Zhang, L.L., Li, J.H., Li, X., Zhang, J., Zhu, H.
  (2016) *Rainfall-Induced Soil Slope Failure Stability Analysis and Probabilistic Assessment*,
  CRC Press

- Froude, M.J., Petley, D.N.
  **Global Fatal Landslide Occurrence from 2004 to 2016**
  (2018) *Nat. Hazards Earth Syst. Sci.*, 18 (8), pp. 2161-2181.

- Azzmi, N.M., Noor, N.M., Jamaludin, N.
  **Geotechnical Approaches for Slope Stabilization in Residential Area**
  (2011) *The 2Nd International Building Control Conference*, 20, pp. 474-482.

- Simon, N., Menzies, B., Matthews, M.
  (2007) *A Short Course in Soil and Rock Slope Engineering*,
  London: Thomas Telford

- (2016) *Malaysia*, 2010-2040.
  Department of Statistics Malaysia, Malaysia

- Abdullah, R.A., Ahmad, H., Amin, M.F.M., Yunus, N.M., Mashros, N., Hassan, S.A., Ali, N.
  **Efficiency of Slope Remedial Work at Bukit Nanas, Malaysia**
  (2015) *Journal of Advanced Research in Applied Mechanics*, 7 (1), pp. 1-11.

- Budania, R., Arora, R.P.
  **Soil Nailing for Slope Stabilization: An Overview**
  (2016) *International Journal of Engineering Science and Computing*, 6 (12), pp. 3877-3882.

- Huang, R.Q.
  **Large-scale Landslides and Their Sliding Mechanisms in China Since the 20th century**
  (2007) *Chinese Journal of Rock Mechanics and Engineering*, 26 (3), pp. 433-454.

- Mariappan, S., Mohammad, A., Low, T.H., Hassan, N., Chong, S.
  (2010) *Remedial Measures Adopted for Slope Failure At*,
  Bukit Antarabangsa, Malaysia

- Qasim, S., Harahap, I., Baharom, S., Imran, M.
  **Human Error Causes in Slope Engineering Practices**
  (2014) *Applied Mechanics and Materials*, 567, pp. 730-735.

- Gue, S.S., Cheah, S.W.
  **Geotechnical Challenges in Slope Engineering of Infrastructures**
  (2008) *Available*,

- Gue, S.S., Tan, Y.C.
  **Landslides: Case Histories, Lessons Learned and Mitigation Measures. Landslide, Sinkhole**
  (2006) *Structure Failure*,
  MYTH or SCIENCE? Ipoh, Perak

- Liew, S.S., Khoo, C.M.
  **Design and Construction of Soil Nail Strengthening Work Over Uncontrolled Fill for a 14.5m Deep Excavation. 10th International Conference on Piling and Deep Foundations, Amsterdam, The Netherlands**
  (2006) *Available*,

- (2013) *Slope Failure Repair Using Polyfelt PEC at Jalan Gunung Raya-Langkawi*, Malaysia. Tencate

- Low, T.H., Ali, F., Ibrahim, A.S.
  (2012) *An Investigation on One of the Rainfall-Induced Landslides in Malaysia*, 17, pp. 435-449.

- Izumi, T., Matsuura, S., Mohd Yusof, A.F., Razak, K.A., Moriguchi, S., Kure, S., Jamal, M.H., Supar, L.M.
  (2019) *Disaster Risk Report. Irides, Japan; Universiti Teknologi Malaysia; Selangor Disaster Management Unit*, pp. 1-108.
  Selangor State Government, Malaysia

- Amir, Y.
  **Drug Dens, Robber Hideouts: Calls Grow for KL's Highland Towers to be Torn Down 25 years after Disaster**
  (2019) *Available*,

- Sutejo, Y., Gofar, N.
  **Effect of Area Development on the Stability of Cut Slopes. The 5th International Conference of Euro Asia Civil Engineering**
  (2015) *Forum*, 125, pp. 331-337.


**Correspondence Address**
Hasbollah D.Z.A.; Centre of Tropical Geoengineering, Malaysia; email: dzulaika@utm.my
Romanah N.A.; Centre of Tropical Geoengineering, Malaysia; email: niaamaniyah@gmail.com

**Publisher:** Books and Journals Private Ltd.

**ISSN:** 00222755
**CODEN:** JMMFA
**Language of Original Document:** English
**Abbreviated Source Title:** J Mines Met Fuels
2-s2.0-85114987041
**Document Type:** Article
**Publication Stage:** Final
**Source:** Scopus