

DAFTAR PUSTAKA

- Abdullah, M. S., Karim, H. H., & Samueel, Z. W. (2022). *Investigation structural settlement by Ground Penetrating Radar (Case study)*. IOP Conference Series: Earth and Environmental Science, 961(1). <https://doi.org/10.1088/1755-1315/961/1/012037>
- Alvira, 2024. *Identifikasi Utilitas Bawah Permukaan Berdasarkan Model 2D Data Ground Penetrating Radar di Daerah X*. Fakultas Sains dan Teknologi, UIN Syarif Hidayatullah Jakarta.
- Annan, A. P. (2001). *Ground Penetrating Radar*. Sensors & Software Inc., Mississauga, Ontario, Canada.
- Annan, A. P. (2008). Electromagnetic Principles of *Ground Penetrating Radar*. <https://doi.org/10.1016/B978-0-444-53348-7.00001-6>
- Ardhila, D., Sari, K., & Kusumawardani, R. (2024). *Interpretation of Subgrade Conditions Beneath Flexible and Rigid Pavement Layers Using Ground Penetrating Radar (GPR)*. Vol. 26, Nomor 1. <http://journal.unnes.ac.id/nju/index.php/jtsp/index>
- Benedetto, A., & Pajewski, L. (Eds.). (2015). *Civil Engineering Applications of Ground Penetrating Radar*. Springer International Publishing. <https://doi.org/10.1007/978-3-319-04813-0>
- Budiono, K., Noviadi, Y., Latuputty, G., & Hernawan, U. (2012). *Investigation of Ground Penetrating Radar for Detection of Road Subsidence Northcoast of Jakarta, Indonesia Penyelidikan “Ground Penetrating Radar” Untuk Mendeteksi Penurunan Jalan di Pantai Utara Jakarta, Indonesia*. Bulletin of the Marine Geology (Vol. 27, Nomor 2).
- Cameron, N. R., Pulunggono, A., & Hardjoprawiro, S. (1982). *Geological Map of the Medan Quadrangle, Sumatra*. Geological Research and Development Centre.
- Cassidy, N., & Jol, H. M. (2009). *Ground Penetrating Radar Data Processing, Modelling and Analysis*. Ground Penetrating Radar.
- Daniels, D. (2004). *Ground Penetrating Radar*. (Vol. 15, hlm. 726). <https://doi.org/10.1049/PBRA015E>
- Daniels, D. J., & Bash, E. (2004). *Ground Penetrating Radar*. 2nd Edition, Volume 1.
- Davis, J. L., and Annan, A. P. (1989). *Ground penetrating radar for high resolution mapping of soil and rock stratigraphy*. Geophysical Prospecting 37, p. 531–551.

- Dinh, K., Gucunski, N., Tran, K., Novo, A., & Nguyen, T. (2021). *Full-resolution 3D imaging for concrete structures with dual polarization GPR*. <https://doi.org/10.1016/j.autcon.2021.103652>
- Direktorat Jenderal Bina Marga. (2024). *Manual Desain Perkerasan Jalan*. Kementerian Pekerjaan Umum dan Perumahan Rakyat, Jakarta.
- Galloway, D. L., Erkens, G., Kuniansky, E. L., & Rowland, J. C. (2016). *Preface: Land subsidence processes*. *Hydrogeology Journal*, 24(3), 547–550. <https://doi.org/10.1007/s10040-016-1386-y>.
- Goodman, D., Piro, S., Nishimura, Y., Schneider, K., Hongo, H., Higashi, N., Steinberg, J., & Damiata, B. (2009). *Ground Penetrating Radar Theory and Applications* (hlm. 479–508). Elsevier. <https://doi.org/https://doi.org/10.1016/B978-0-444-53348-7.00015-6>
- Griffiths, D. J. (2017). *Introduction to Electrodynamics*. <https://doi.org/10.1017/9781108333511>
- Harefa. (2011). *Analisis Perbandingan Model Propagasi untuk Komunikasi Bergerak pada Sistem GSM 900*. Universitas Sumatera Utara.
- Hernawan, U., Geurhaneu, N. Y., & Zulfikar, M. (2019). *Characteristic of Shallow Subsurface Quaternary Sediment in Nongsa Isle, Part of Putri Islands, Batam, Based on Georadar Data Interpretation*. *Bulletin Of The Marine Geology*, 34(2). <https://doi.org/10.32693/bomg.34.2.2019.624>
- Ibrahim, E., Basri, H., & Alam, I. S. (2007). *Penggunaan Metode GPR dan Geolistrik Pada Eksplorasi Batubara*. Prosiding Seminar Nasional XIII - FTI-ITS.
- Ismail, N. A., Muztaza, N. M., & Saad, R. (2016). *Reflectivity of electromagnetic (EM) wave in shallow ground penetrating radar (GPR) survey*. *Jurnal Teknologi*, 78 (7–3). <https://doi.org/10.11113/jt.v78.9500>
- Ismail, N., & Yanis, M. (2020). *Elektromagnetik Plane Wave: Teori dan Aplikasi*. <https://doi.org/10.52574/syiahkualauniversitypress.250>
- Karim, M. N. A., Malek, M. F. A., Jamlos, M. F., Seng, L. Y., & Saudin, N. (2013). *Design of Ground Penetrating Radar antenna for buried object detection*. RFM 2013 - 2013 IEEE International RF and Microwave Conference, Proceedings. <https://doi.org/10.1109/RFM.2013.6757260>
- Kunz, K. S., & Luebbers, R. J. (2018). *The Finite Difference Time Domain Method for Electromagnetics*. <https://doi.org/10.1201/9780203736708>
- Laila, N., Hariadi, F. I., & Alam, B. R. (2019). *Design and Implementation of 2.4 GHz Microstrip Antenna for FMCW Radar*. Proceeding - 2019 International Symposium on Electronics and Smart Devices, ISESD 2019. <https://doi.org/10.1109/ISESD.2019.8909560>

- Lehmann, F., & Green, A. G. (1999). *Semiautomated georadar data acquisition in three dimensions*. *Geophysics*, 64(3). <https://doi.org/10.1190/1.1444581>
- Li, S., & Guo, C. (2019). *Study on Ground-Penetrating Radar (GPR) Application in Pavement Deep Distress Detection*. *Journal of Transportation Technologies*, 9, 232–259. <https://doi.org/10.4236/jtts.2019.92015>
- Minshull, T. A. (2003). Review of *An Introduction to Geophysical Exploration*. *Geological Magazine*, 140(3), 366. <https://doi.org/10.1017/S0016756803378021>
- Mussett, A. E., Khan, M. A., & Button, S. (2000). *Looking into the Earth: An introduction to geological geophysics*. Vol. 83, Nomor 33.
- Oktafiani, F., Sulistyaningsih, & Wijayanto, Y. N. (2007). *Sistem Ground Penetrating Radar untuk Mendeteksi Benda-benda di Bawah Permukaan Tanah*. *Inkom Journal of Informatics, Control Systems, and Computers*, 1(2).
- Pratiwi, D., Rivai, M., & Budiman, F. (2017). *Rancang Bangun Deteksi Jalur Pipa Terpendam Menggunakan Mobile Robot dengan Metal Detector*. *Jurnal Teknik ITS* Vol. 6, No. 1, (2017) ISSN: 2337-3539 (2301-9271 Print), 6 (March).
- Putro, A. A., Supriyanto, & Rinaldi, A. (2019). *Interpretasi Bawah Permukaan Menggunakan Metode GPR (Ground Penetrating Radar) di Amblesan Jalan Ring Road II Kota Samarinda*. *Jurnal Geosains Kutai Basin*, 2(1).
- Quan, Y., & Harris, J. M. (1997). *Seismic Attenuation Tomography Using the Frequency Shift Method*. *Geophysics*, 62, 895–905.
- Rasimeng, S., Mandang, I., & Suharno. (2019). *Identification of eroded sediment layer thickness and depth of Mahakam River at Tenggarong Bridge Area, Kutai Kartanegara East Kalimantan using Ground Penetrating Radar Method*. *IOP Conference Series: Earth and Environmental Science*, 279(1). <https://doi.org/10.1088/1755-1315/279/1/012040>
- Reynolds, J. M. (1997). *An Introduction to Applied and Environmental Geophysics*. John Wiley and Sons Inc.
- Rittenhouse, J. (2008). *Ground Penetrating Radar*. Environmental Protection Agency.
- Serin, S., Saltan, M., & Terzi, S. (2022). *Determination of Highway Pavement Layer Thickness and Layer Anomalies with GPR in Burdur Section of D330 Highway*. *Suleyman Demirel Universitesi Fen Bilimleri Enstitüsü Dergisi*, 26(2). <https://doi.org/10.19113/sdufenbed.1000547>
- Sharma, P. V. (2002). *Environmental and Engineering Geophysics*. Cambridge University Press.

- Travassos, X. L., Pantoja, M. F., & Ida, N. (2021). *Ground Penetrating Radar: Improving sensing and imaging through numerical modeling*. <https://doi.org/10.1049/PBCE115E>
- Van Bemmelen, R. W. (1949). *The Geology of Indonesia, Volume IA: General Geology of Indonesia and Adjacent Archipelagoes*. Government Printing Office.
- Wahyu, Yuyu; S, Haryanto Sachrawi; H, A. Y. (2013). *Antena Spiral - Dipole untuk Ground Penetrating Radar (GPR) Spiral Dipole Antenna for Ground Penetrating Radar (GPR)*. Jurnal Elektronika dan Telekomunikasi, 13(2).
- Wallace, S. C., Nobes, D. C., Davis, K. J., Burbank, D. W., & White, A. (2010). *Three-dimensional GPR imaging of the benmore anticline and step-over of the ostler fault, South Island, New Zealand*. Geophysical Journal International, 180(2). <https://doi.org/10.1111/j.1365-246X.2009.04400.x>
- Wan Muhammad Naim Wan Norjik. (2022). *Roadlayers Settlement Detection Using Ground Penetrating Radar (GPR) at Gunung Jerai, Yan, Kedah* [Thesis]. Universiti Teknologi MARA (UiTM).
- Wangsness, R. K. (1979). *Electromagnetic Fields* (2nd ed.). John Wiley & Sons.
- Yang, J., Ruan, K., Gao, J., Yang, S., & Zhang, L. (2022). *Pavement Distress Detection Using Three-Dimension Ground Penetrating Radar and Deep Learning*. Applied Sciences (Switzerland), 12(11). <https://doi.org/10.3390/app12115738>
- Zainuddin, N. E., Zainal, Z., & Nagendran, S. K. (2023). *Subsurface Investigation on Federal Route Failure at Pengkalan Raja, Pontian, Johor*. IOP Conference Series: Earth and Environmental Science, 1140(1). <https://doi.org/10.1088/1755-1315/1140/1/012003>