

## REFERENCES

- [1] K. A. D. Y. T. Kahandawa Arachchi, J. C. P. H. Gamage, and E. R. K. Chandrathilaka, "Bond Performance of Carbon Fiber Reinforced Polymer (CFRP) Strengthened Reinforced Concrete Curved Beams," in *International Conference on Civil Engineering and Applications*, 2019.
- [2] M. Perner, S. Algermissen, R. Keimer, and H. P. Monner, "Robotics and Computer-Integrated Manufacturing Avoiding defects in manufacturing processes : A review for automated CFRP production," *Robot. Comput. Integr. Manuf.*, vol. 38, pp. 82–92, 2016.
- [3] S. Hegde, B. S. Shenoy, and K. N. Chethan, "Materials Today : Proceedings Review on carbon fiber reinforced polymer ( CFRP ) and their mechanical performance," *Mater. Today Proc.*, no. xxxx, pp. 1–5, 2019.
- [4] J. Yanagimoto and K. Ikeuchi, "CIRP Annals - Manufacturing Technology Sheet forming process of carbon fiber reinforced plastics for lightweight parts," *CIRP Ann. - Manuf. Technol.*, vol. 61, no. 1, pp. 247–250, 2012.
- [5] S. Visal and S. U. Deokar, "A Review Paper on Properties of Carbon Fiber Reinforced Polymers," *Int. J. Innov. Res. Sci. Technol.*, vol. 2, no. 12, pp. 238–243, 2016.
- [6] J. C. P. H. Gamage and M. B. Wong, "Bond characteristics of CFRP plated concrete members under elevated temperatures," *Compos. Struct.*, vol. 75, pp. 199–205, 2006.
- [7] S. Aaruga, "Finite Element Modelling on Flexural Performance of CFRP Strengthened Reinforced Concrete Curved Beams," *2019 Moratuwa Eng. Res. Conf.*, pp. 662–667, 2019.
- [8] K. A. D. Y. T. K. Arachchi, J. C. P. H. Gamage, and E. R. K. Chandrathilake, "Bond Performance of Carbon Fiber Reinforced Polymer (CFRP) Strengthened Reinforced Concrete Curved Beams," in *International Conference on Civil Engineering and Applications*, 2019.
- [9] Center of Composite Materials, "Annual Report," Newark, 1994.
- [10] K. Dong, K. Hu, and W. Gao, "Fire Behavior of Full-Scale CFRP-Strengthened RC Beams Protected with Different Insulation Systems," *J. Asian Archit. Build.*

- Eng.*, vol. 15, no. 3, pp. 581–588, 2016.
- [11] J. P. Firmo, J. R. Correia, and L. A. Bisby, “Fire behaviour of FRP-strengthened reinforced concrete structural elements: A state-of-the-art review,” *Compos. Part B Eng.*, vol. 80, pp. 198–216, 2015.
- [12] J. C. P. H. Gamage and M. B. Wong, “Durability of CFRP-Strengthened Concrete Members Under Extreme Temperature and Humidity Durability of CFRP-strengthened concrete members under extreme temperature and humidity \*,” *Aust. J. Struct. Eng.*, vol. 9, no. 2, pp. 111–118, 2015.
- [13] J. C. P. H. Gamage, M. B. Wong, and R. Al-Mahadi, “Performance of CFRP strengthened concrete members under elevated temperatures,” *Proceeding Int. Symposium Bond Behav. FRP Struct. (BBFS 2005)*, no. Bbfs, pp. 113–118, 2005.
- [14] D. Cree, E. U. Chowdhury, M. F. Green, L. A. Bisby, and N. Bénichou, “Performance in fire of FRP-strengthened and insulated reinforced concrete columns,” *Fire Saf. J.*, vol. 54, pp. 86–95, 2012.
- [15] W. Jung, J. Park, J. Kang, and M. Keum, “Flexural Behavior of Concrete Beam Strengthened by Near-Surface Mounted CFRP Reinforcement Using Equivalent Section Model,” *Adv. Mater. Sci. Eng.*, vol. 2017, pp. 1–16, 2017.
- [16] A. U. R. Khan and S. Fareed, “Behaviour of Reinforced Concrete Beams Strengthened by CFRP Wraps with and without end anchorages,” *Procedia Eng.*, vol. 77, pp. 123–130, 2014.
- [17] V. K. R. Kodur and D. Baingo, “Fire Resistance of FRP Reinforced Concrete Slabs,” *Natl. Res. Counc. Canada*, no. 758, 1998.
- [18] L. A. Foster, S.K. and Bisby, “High temperature residual properties of externally-bonded FRP systems,” *Proc. 7th Int. Symp. fiber Reinf. Polym. Reinf. Reinf. Concr. Struct.*, vol. ACI-SP230, no. 7, p. SP-230-70, 2005.
- [19] E. R. . Chandrathilaka and G. J.C.P.H., “Fire Performance of CFRP Strengthened Steel I Beams Cured at Elevated Temperature,” *Springer, Singapore*, vol. 44, 2019.
- [20] E. R. K. Chandrathilaka, J. C. P. H. Gamage, and S. Fawzia, “Mechanical characterization of CFRP / steel bond cured and tested at elevated temperature,” *Compos. Struct.*, vol. 207, no. July 2018, pp. 471–477, 2019.
- [21] K. A. D. Y. T. Kahandawa Arachchi, J. C. P. H. Gamage, and G. I. P. De Silva,

- “Thermal Insulation Systems for CFRP/Concrete Composites: A Review,” in *International Conference on Structural Engineering and Construction Management*, 2019.
- [22] T. B. Carlos and J. P. C. Rodrigues, “Experimental bond behaviour of a CFRP strengthening system for concrete elements at elevated temperatures,” *Constr. Build. Mater.*, vol. 193, pp. 395–404, 2018.
- [23] J. P. Firmo, J. R. Correia, and P. França, “Fire behaviour of reinforced concrete beams strengthened with CFRP laminates: Protection systems with insulation of the anchorage zones,” *Compos. Part B Eng.*, vol. 43, no. 3, pp. 1545–1556, Apr. 2012.
- [24] AS 1530.4, *Methods for fire tests on building materials, components and structures - Fire-resistance test of elements of construction*. 2005.
- [25] R. Ranasinghe, D. Jinadasa, H. Srilal, and J. Gamage, “Bond performance of CFRP strengthened concrete subjected to fire,” in *Civil Engineering Research for Industry*, 2011, pp. 37–42.
- [26] J. C. P. H. Gamage, R. Al-Mahaidi, and M. B. Wong, “Effect of insulation on the bond behaviour of CFRP-Plated concrete elements,” in *Proceeding of the International Symposium on Bond Behaviour of FRP in Structures (BBFS 2005)*, 2005, pp. 119–123.
- [27] Z. S. Wu, K. Iwashita, S. Yagashiro, T. Ishikawa, and Y. Hamaguchi, “Temperature effect on bonding and debonding behavior between FRP sheets and concrete,” in *FRP composites in civil engineering - CICE 2004*, 2004, pp. 905–912.
- [28] J. C. P. H. Gamage, R. Al-Mahaidi, and M. B. Wong, “Effect of insulation on the bond behaviour of CFRP-Plated concrete elements,” in *Proceedings of the International Symposium on Bond Behaviour of FRP in Structures*, 2005, pp. 119–123.
- [29] K. H. Kim, S. E. Jeon, J. K. Kim, and S. Yang, “An experimental study on thermal conductivity of concrete,” *Cem. Concr. Res.*, vol. 33, no. 3, pp. 363–371, 2003.
- [30] C. Udawattha and R. Halwatura, “Thermal performance and structural cooling analysis of brick, cement block, and mud concrete block,” *Adv. Build. Energy*

- Res.*, vol. 12, no. 2, pp. 150–163, 2018.
- [31] F. Batool, M. M. Rafi, and V. Bindiganavile, “Microstructure and thermal conductivity of cement-based foam:A review,” *J. Build. Eng.*, vol. 20, no. February 2017, pp. 696–704, 2018.
- [32] B. Bhattacharjee and S. Krishnamoorthy, “Permeable Porosity and Thermal Conductivity of Construction Materials,” *J. Mater. Civ. Eng.*, vol. 16, no. 4, pp. 322–330, Aug. 2004.
- [33] V. Bindiganavile, F. Batool, and N. Suresh, “Effect of fly ash on thermal properties of cement based foams evaluated by transient plane heat source,” *Indian Concr. J.*, vol. 86, 2012.
- [34] I. Asadi, P. Shafigh, Z. F. Bin Abu Hassan, and N. B. Mahyuddin, “Thermal conductivity of concrete – A review,” *J. Build. Eng.*, vol. 20, no. July, pp. 81–93, 2018.
- [35] A. Ghosh, A. Ghosh, and S. Neogi, “Reuse of fly ash and bottom ash in mortars with improved thermal conductivity performance for buildings,” *Heliyon*, vol. 4, no. 11, p. e00934, 2018.
- [36] D. P. Bentz, M. A. Peltz, A. Durán-Herrera, P. Valdez, and C. A. Juárez, “Thermal properties of high-volume fly ash mortars and concretes,” *J. Build. Phys.*, vol. 34, no. 3, pp. 263–275, 2011.
- [37] P. Torkittikul, T. Nochaiya, W. Wongkeo, and A. Chaipanich, “Utilization of coal bottom ash to improve thermal insulation of construction material,” *J. Mater. Cycles Waste Manag.*, vol. 19, no. 1, pp. 305–317, 2017.
- [38] A. K. Mandal and O. P. Sinha, “Production of thermal insulation blocks from bottom ash of fluidized bed combustion system,” *Waste Manag. Res.*, vol. 35, no. 8, pp. 810–819, 2017.
- [39] R. Dylewski and J. Adamczyk, “The comparison of thermal insulation types of plaster with cement plaster,” *J. Clean. Prod.*, vol. 83, pp. 256–262, 2014.
- [40] K. Ganesan, K. Rajagopal, and K. Thangavel, “Rice husk ash blended cement : Assessment of optimal level of replacement for strength and permeability properties of concrete,” *Constr. Build. Mater.*, vol. 22, pp. 1675–1683, 2008.
- [41] G. A. Habeeb and H. Bin Mahmud, “Study on Properties of Rice Husk Ash and Its Use as Cement Replacement Material 3 . Experimental Work 2 . Scope of

- Work,” *Mater. Res.*, vol. 13, no. 2, pp. 185–190, 2010.
- [42] K. Selvaranjan, J. C. P. H. Gamage, and G. I. P. De Silva, “Thermal performance of rice husk ash mixed mortar in concrete and masonry buildings,” *Bud. i Archit.*, vol. 19, no. 4, pp. 43–52, 2020.
- [43] P. Ramadoss and T. Sundararajan, “Utilization of Lignite-Based Bottom Ash as Partial Replacement of Fine Aggregate in Masonry Mortar,” *Arab. J. Sci. Eng.*, vol. 39, no. 2, pp. 737–745, 2014.
- [44] P. Aggarwal, Y. Aggarwal, and S. M. Gupta, “Effect of bottom ash as replacement of fine aggregates in concrete,” *ASIAN J. Civ. Eng. (BUILDING HOUSING)*, vol. 8, no. 1, pp. 49–62, 2007.
- [45] A. K. Mandal and O. P. Sinha, “Review on Current Research Status on Bottom Ash: An Indian Prospective,” *J. Inst. Eng. Ser. A*, vol. 95, no. 4, pp. 277–297, 2014.
- [46] W. Wongkeo, P. Thongsanitgarn, K. Pimraksa, and A. Chaipanich, “Compressive strength, flexural strength and thermal conductivity of autoclaved concrete block made using bottom ash as cement replacement materials,” *Mater. Des.*, vol. 35, pp. 434–439, 2012.
- [47] G. Vasudevan, “Performance on Coal Bottom Ash in Hot Mix Asphalt,” *Int. J. Res. Eng. Technol.*, vol. 02, no. 08, pp. 24–33, 2015.
- [48] *RMRC User Guidelines*. 2007.
- [49] M. Cheriaf, J. Cavalcante Rocha, and J. Pera, “Pozzolanic properties of pulverized coal combustion bottom ash,” *Cem. Concr. Res.*, vol. 29, pp. 1387–1391, 1999.
- [50] S. U. Hendawitharana and S. M. A. Nanayakkara, “Use of bottom ash from coal fired thermal power plants in production of cellular lightweight concrete,” *MERCon 2018 - 4th Int. Multidiscip. Moratuwa Eng. Res. Conf.*, pp. 209–214, 2018.
- [51] ASTM International, “ASTM C618-19, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete,” West Conshohocken, PA, 2019.
- [52] P. Onprom, K. Chaimoon, and R. Cheerarot, “Influence of Bottom Ash Replacements as Fine Aggregate on the Property of Cellular Concrete with

- Various Foam Contents,” *Adv. Mater. Sci. Eng.*, vol. 2015, pp. 1–11, 2015.
- [53] K. Dharani, “Experimental Study on Properties of Concrete Using Bottom Ash With Addition of Polypropylene Fibre,” *Novat. Publ. Int. J. Res. Publ. Eng. Technol.*, vol. 3, no. 8, pp. 2454–7875, 2017.
- [54] M.-J. Yang, H.-Y. Wang, and H.-Y. Wang, “Effects on Strengths of Cement Mortar When Using Incinerator Bottom Ash as Fine Aggregate,” *World J. Eng. Technol.*, vol. 02, no. 03, pp. 42–47, 2014.
- [55] J. G. Jang, H. J. Kim, H. K. Kim, and H. K. Lee, “Resistance of coal bottom ash mortar against the coupled deterioration of carbonation and chloride penetration,” *Mater. Des.*, vol. 93, pp. 160–167, 2016.
- [56] P. Tang, M. V. . Florea, P. Spiesz, and H. J. . Brouwers, “The application of treated bottom ash in mortar as cement replacement,” *EurAsia Waste Manag. Symp. April 2014, YTU 2010 Congr. Center, Istanbul/Turkiye*, no. 2014, pp. 1077–1082, 2014.
- [57] R. M. I. E. Piyaathne and K. M. L. A. Udamulla, “Use of Bottom Ash in Replacement of River Sand in Making Cement Mortar,” in *International Symposium on Advances in Civil and Environmental Engineering Practices for Sustainable Development*, 2013, pp. 191–197.
- [58] A. Cheng, “Effect of incinerator bottom ash properties on mechanical and pore size of blended cement mortars,” *Mater. Des.*, vol. 36, pp. 859–864, 2012.
- [59] ASTM International, “ASTM E119-19, Standard Test Methods for Fire Tests of Building Construction and Materials,” West Conshohocken, PA, 2019.
- [60] B. Williams, V. Kodu, M. F. Green, and L. Bisby, “Fire Endurance of Fiber-Reinforced Polymer Strengthened Concrete T-Beams,” *ACI Struct. J.*, vol. 105, no. 1, 2008.
- [61] H. Blontrock, L. Taerwe, and P. Vandeveld, “Fire tests on concrete beams strengthened with fibre composite laminates,” in *Proceedings of the International PhD Symposium in Civil Engineering, Vienna (Austria)*, 2000, pp. 151–161.
- [62] International Organization for Standardization, “ISO 834-2:2019. Fire-resistance tests — Elements of building construction,” 2019.
- [63] A. G. Mal’Chik, S. V. Litovkin, and P. V. Rodionov, “Investigations of

- physicochemical properties of bottom-ash materials for use them as secondary raw materials,” *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 91, no. 1, 2015.
- [64] M. Mcquarrle, “Thermal Conductivity: VII, Analysis of Variation of Conductivity with Temperature for Al<sub>2</sub>O<sub>3</sub>, BeO, and MgO,” *J. Am. Ceram. Soc.*, vol. 37, no. 02, 1954.
- [65] British Standards, “BS1377:Part 2:1990, Methods of test for Soils for civil engineering,” 1990.
- [66] ASTM International, “ASTM C1329 / C1329M-16a, Standard Specification for Mortar Cement,” West Conshohocken, PA, 2016.
- [67] ASTM International, *ASTM C150 / C150M-19a, Standard Specification for Portland Cement*. West Conshohocken, 2019.
- [68] ASTM International, “ASTM D7340-07, Standard Practice for Thermal Conductivity of Leather,” West Conshohocken, PA, 2018.
- [69] ASTM International, “ASTM C109 / C109M-20a, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars,” West Conshohocken, PA, 2020.
- [70] K. Liu, Z. Wang, C. Jin, F. Wang, and X. Lu, “An experimental study on thermal conductivity of iron ore sand cement mortar,” *Constr. Build. Mater.*, vol. 101, pp. 932–941, 2015.
- [71] R. Demirbog, “Influence of mineral admixtures on thermal conductivity and compressive strength of mortar,” *Energy Build.*, vol. 35, pp. 189–192, 2003.
- [72] J. Olmeda, M. I. S. De Rojas, M. Frías, S. Donatello, and C. R. Cheeseman, “Effect of petroleum ( pet ) coke addition on the density and thermal conductivity of cement pastes and mortars,” *Fuel*, vol. 107, no. 2013, pp. 138–146, 2015.
- [73] J. C. Mendes *et al.*, “On the relationship between morphology and thermal conductivity of cement-based composites,” *Cem. Concr. Compos.*, vol. 104, no. October 2018, p. 103365, 2019.
- [74] V. Corinaldesi, A. Mazzoli, and G. Moriconi, “Mechanical behaviour and thermal conductivity of mortars containing waste rubber particles,” *Mater. Des.*, vol. 32, no. 3, pp. 1646–1650, 2011.
- [75] Millennium Concrete Technologies (Pvt) Ltd., “Product datasheet,” 2017.

- [76] “Technical datasheet, X-Wrap Plate Adhesive, High performance epoxy adhesive for carbon fiber strengthening systems,” 2018. [Online]. Available: <http://www.x-calibur.us>. [Accessed: 05-Dec-2019].
- [77] “Technical datasheet, X-Wrap C300, High strength carbon fiber fabric for structural strengthening.” [Online]. Available: <http://www.x-calibur.us>. [Accessed: 05-Dec-2019].