

Acknowledgements

Funding provided by The Senate Research Committee, University of Moratuwa is highly appreciated (Grant No: SRC/LT/2016/19).

References

- Nguyen, T. et al. (2013) 'Curing effects on steel / CFRP double strap joints under combined mechanical load, temperature and humidity', *Construction and Building Materials*. Elsevier Ltd, 40, pp. 899–907. doi: 10.1016/j.conbuildmat.2012.11.035.
- Elchalakani, M., Karrech, A., Basarir, H., Zhaob, X., Fawzia, S. and Hassanein, M.F. (2017) 'Strengthening of mild steel struts using CFRP sheets subjected to uniform axial compression', *Thin Walled Structures*. Elsevier Ltd, 116(January), pp. 96–112. doi: 10.1016/j.tws.2017.03.010.
- Colombi, P. and Fava, G. (2016) 'Fatigue crack growth in steel beams strengthened by CFRP strips', *THEORETICAL AND APPLIED FRACTURE MECHANIC*. Elsevier Ltd. doi: 10.1016/j.tafmec.2016.01.007.
- Liu, M. and Dawood, M. (2017) 'Reliability analysis of adhesively bonded CFRP-to-steel double lap shear joint with thin outer adherends', *Construction and Building Materials*. Elsevier Ltd, 141, pp. 52–63. doi: 10.1016/j.conbuildmat.2017.02.113.
- Selvaraj, S. and Madhavan, M. (2016) 'Enhancing the structural performance of steel channel sections by CFRP strengthening', *Thin-Walled Structures*, 108, pp. 109–121.
- Elchalakani, M. (2016) 'Rehabilitation of corroded steel CHS under combined bending and bearing using CFRP', *Journal of Constructional Steel Research*. Elsevier Ltd, 125, pp. 26–42. doi: 10.1016/j.jcsr.2016.06.008.
- Batuwitage, C. et al. (2017) 'Evaluation of bond properties of degraded CFRP-strengthened double strap joints', *Composite Structures*. Elsevier Ltd, 173, pp. 144–155. doi: 10.1016/j.compstruct.2017.04.015.
- Al-mosawe, A., Kalfat, R. and Al-mahaidi, R. (2016) 'Strength of Cfrp-steel double strap joints under impact loads using genetic programming', *Composite Structures*. Elsevier Ltd. doi: 10.1016/j.compstruct.2016.11.016.
- Yu, Q. Q. et al. (2016) 'Boundary element analysis of edge cracked steel plates strengthened by CFRP laminates', *Thin-Walled Structures*, 100, pp. 147–157. doi: 10.1016/j.tws.2015.12.016.

- Ghaemdoost, M. R., Narmashiri, K. and Yousefi, O. (2016) 'Structural behaviors of deficient steel SHS short columns strengthened using CFRP', *Construction and Building Materials*. Elsevier Ltd, 126, pp. 1002–1011. doi: 10.1016/j.conbuildmat.2016.09.099.
- Wang, Z. and Wang, Q. (2017) 'Fatigue behaviour of CFRP strengthened open-hole steel plates', *Thin Walled Structures*. Elsevier Ltd, 115(February), pp. 176–187. doi: 10.1016/j.tws.2017.02.015.
- Al-zubaidy, H., Al-mahaidi, R. and Zhao, X. (2013) 'Finite element modelling of CFRP / steel double strap joints subjected to dynamic tensile loadings', *Composite Structures*, 99, pp. 48–61. doi: 10.1016/j.compstruct.2012.12.003.
- Yue, Q. et al. (2016) 'Research on fatigue performance of CFRP reinforced steel crane girder', *Composite Structures*. Elsevier Ltd, 154, pp. 277–285. doi: 10.1016/j.compstruct.2016.07.066.
- Focacci, F., Nanni, A. and Bakis, C.E. (2000) 'Local bond–slip relationship for FRP reinforcement in concrete', *J Compos Construct ASCE*, 4(1), pp.24–31
- Lu, X.Z., Teng, J.G., Ye, L.P. and Jiang, J.J. (2005) 'Bond–slip models for FRP sheets/plates bonded to concrete', *Eng Struct*, 27(6), pp.920–37.
- Dong, K. and Hu, K. (2016) 'Development of bond strength model for CFRP-to-concrete joints at high temperatures', *Composites Part B*. Elsevier Ltd, 95, pp. 264–271. doi: 10.1016/j.compositesb.2016.03.088.
- Fawzia, S., Zhao, X. and Al-mahaidi, R. (2010) 'Bond – slip models for double strap joints strengthened by CFRP', *Composite Structures*. Elsevier Ltd, 92(9), pp. 2137–2145. doi: 10.1016/j.compstruct.2009.09.042.
- Wang, R., Zheng, S. and Zheng, Y. (2011) 'Polymer matrix composites and technology', Woodhead Publishing Limited and Science Press Limited, pp.101-167
- Gilbert, M. (2017) 'Brydson's Plastics Materials', Butterworth-Heinemann is an imprint of Elsevier, pp.59-73.
- Carbas, R. J. C., Marques, E. A. S. and Marques, E. A. S. (2014) 'Effect of Cure Temperature on the Glass Transition Temperature and Mechanical Properties of Epoxy Adhesives', *The Journal of Adhesion*. 90, pp. 37–41. doi: 10.1080/00218464.2013.779559.
- Rudin, A. and Choi, P. (2013) 'The Elements of Polymer Science & Engineering', Academic Press is an imprint of Elsevier, pp.149-229.
- Kotynia, R., Adamczewska, K., Strakowska, A., Maslowski, M. and Strzelec, K. (2017) 'Effect of accelerated curing conditions on shear strength and glass

transition temperature of epoxy adhesives', 193, pp. 423–430. doi: 10.1016/j.proeng.2017.06.233.

Zhang, Y., Adams, R. D. and Lucas, F. M. (2014) 'Absorption and glass transition temperature of adhesives exposed to water and toluene', *International Journal of Adhesion and Adhesives*. Elsevier, 50, pp. 85–92. doi: 10.1016/j.ijadhadh.2014.01.022.

Nguyen, T. et al. (2011) 'Mechanical characterization of steel / CFRP double strap joints at elevated temperatures', *Composite Structures*. Elsevier Ltd, 93(6), pp. 1604–1612. doi: 10.1016/j.compstruct.2011.01.010.

Agarwal, A., Foster, S. J. and Hamed, E. (2016) 'Testing of new adhesive and CFRP laminate for steel-CFRP joints under sustained loading and temperature cycles', *Composites Part B*, 99, pp. 235–247.

Technical data sheet, ARELDITE 420 A/B, two component epoxy adhesive system, Huntsman Advanced Materials, Available at: <http://.huntsman.com> [Accessed 12 Aug. 2018].

Gilbert M. Brydson's *Plastics Materials*, Butterworth-Heinemann is an imprint of Elsevier. 2017, pp. 59-73.

Gamage JCPH, Al-mahaidi R, Wong MB. Integrity of CFRP-concrete bond subjected to longterm cyclic temperature and mechanical stress. *Compos Struct*2016;149:423–33. doi:10.1016/j.compstruct.2016.04.040.

Gamage JCPH, Wong B, Al-Mahaidi R. Performance of CFRP strengthened concrete members under elevated temperatures. In: *International symposium on bond behaviour of FRP in structures (BBFS)*, Hong Kong. p. 7–9.

Gamage JCPH, Al-mahaidi R, Wong B, Ariyachandra MREF. Bond characteristics of CFRPstrengthened concrete members subjected to cyclic temperature and mechanical stress at low humidity. *Compos Struct*2017;160:1051–9. doi:10.1016/j.compstruct.2016.10.131.

Wang R, Zheng S, Zheng Y. *Polymer matrix composites and technology*, Woodhead Publishing Limited and Science Press Limited, 2011, pp.101-167.

Gamage JCPH, Al-mahaidi R, Wong B, Ariyachandra MREF. Bond characteristics of CFRPstrengthened concrete members subjected to cyclic temperature and mechanical stress at low humidity. *Compos Struct*2017;160:1051–9. doi:10.1016/j.compstruct.2016.10.131.

Ranasinghe RATM, Jinadasa DVLR, Srilal HPS, Gamage JCPH. Bond performance of cfrp strengthened concrete subjected to fire. In: *Civil Engineering Research for Industry – 2011*, Sri Lanka. p. 37-42.

Petrie, EM. *Handbook of Adhesives and Sealants*. McGraw-Hill Handbooks, 2006.

ANSYS mechanical user's guide, (2013) ANSYS, Inc. from <http://www.ansys.com>

Gamage JCPH, Wong MB. Bond characteristics of CFRP plated concrete members under elevated temperatures 2006;75:199–205. doi:10.1016/j.compstruct.2006.04.068.

Technical data sheet, X-Wrap C230, High strength carbon fiber fabric for structural strengthening, X-CALIBUR structural systems, Available at: <http://x-calibur.us> [Accessed 12 Aug. 2018].

Technical data sheet, X-Wrap C530, High strength carbon fiber fabric for structural strengthening, X-CALIBUR structural systems, Available at: <http://x-calibur.us> [Accessed 12 Aug. 2018].

Technical data sheet, X-Wrap C300, High strength carbon fiber fabric for structural strengthening, X-CALIBUR structural systems, Available at: <http://x-calibur.us> [Accessed 12 Aug. 2018].