

REFERENCES

- ACI Committee 318, Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary, American Concrete Institute, Farmington Hills, Michigan, 2008.
- Alam, A. K. M. J. & Amanat, K.M. (2012). Finite Element Simulation on Punching Shear Behavior of Reinforced Concrete Slabs, *International Scholarly Research Network ISRN Civil Engineering* Vol 2012, ID 501816, 9 pg doi:10.5402/2012/501816
- Al-Mahmoud, F., Castel, A., François, R., & Tourneur, C. (2009). Strengthening of RC members with near-surface mounted CFRP rods. *Composite Structures*, 91(2), 138-147. doi: 10.1016/j.compstruct.2009.04.040.
- Al-Mayah, A., Soudki, K., & Plumtree, A. (2001). Mechanical Behavior of CFRP Rod Anchors Under Tensile Loading. *Journal of Composites for Construction* © ASCE. 2001.5:128-135.
- Al-Mayah, A., Soudki, K., & Plumtree, A. (2006). Development and Assessment of a New CFRP Rod–Anchor System for Prestressed Concrete. *Applied Composite Materials*, 13(5), 321-334. doi: 10.1007/s10443-006-9019-6
- Al-Mayah, A., Soudki, K., & Plumtree, A. (2007). Novel Anchor System for CFRP Rod: Finite-Element and Mathematical Models. *Journal of Composites for Construction* © ASCE, 10.1061/ASCE1090-0268200711:5469
- Al-Zubaidy, H., Al-Mahaidi, R., & Zhao, X. L. (2013). Finite element modeling of CFRP/steel double strap joints subjected to dynamic tensile loadings. *Composite Structures*, 99, 48–61. DOI: 10.1016/j.compstruct.2012.12.003
- Ariyachandra, E.& Gamage, J.C.P.H.& Al-Mahaidi, Riadh & Kalfat, R. (2017). Effects of surface roughness and bond enhancing techniques on flexural performance of CFRP/concrete composites. *Composite Structures*. 10.1016/j.compstruct.2017.07.028.
- Behzad, P., Sharbatdar, M. K., & Kheyroddin, A. (2016). Different NSM FRP techniques for strengthening of RC two-way slabs with low clear cover thickness. *ScientiaIranica*, 23(2), 520-534. doi: 10.24200/sci.2016.2136
- Biddah, A. (2015) “Innovative Method of Strengthening Punching Shear of Reinforced Concrete Slabs”. *Repair and Renovation of Concrete Structures* (pp. 379-388).
- Birkle G. (2004) “Punching of flat slabs: the influence of slab thickness and stud layout”. Doctoral thesis. University of Calgary, Canada; 2004. 152pp.

British Standards Institution. (2008). Eurocode 2: design of concrete structures: British standard. London: BSI.

Burgoyne, C. (2009) “Fibre Reinforced Polymers – Strengths, Weaknesses, Opportunities and Threats”. *FRPRCS conference*.

Chandrathilaka, K., Gamage, J. C. P. H. & Fawzia, S. (2019). Numerical Modelling of Bond Shear Stress Slip Behavior of CFRP/Steel Composites Cured and Tested at Elevated Temperature. *Composite Structures*. 212. 10.1016/j.compstruct.2019.01.002.

Chou, S. P. Finite element application for strength analysis of scarf-patch repaired composite laminates. MSc Thesis, Department of Aerospace Engineering and the faculty of Graduate School, Wichita State University, USA; 2006.

Djamaluddin, R., Yamaguchi, K., & Hino, S. (2013). Mechanical behavior of the U-anchor of super-CFRP rod under tensile loading. *Journal of Composite Materials*, 48(15), 1875–1885. doi: 10.1177/0021998313491514

Einpaul, J., Bujnak, J., Fernández Ruiz, M., & Muttoni, A. (2016). Study on Influence of Column Size and Slab Slenderness on Punching Strength. *ACI Structural Journal*, 113(1). doi: 10.14359/51687945

El-Enein, H. A., Azimi, H., Sennah, K., & Ghrib, F. (2014). Flexural strengthening of reinforced concrete slab-column connection using CFRP sheets. *Construction and Building Materials*, 57, 126–137. <https://doi.org/10.1016/j.conbuildmat.2014.01.077>

Elstner, R.C. & Hognestad, E. (1956). Shear strength of reinforced concrete slabs. *ACI Journal Proceedings* 53 (2), 29–58

Erki M.A. & Heffernan P.J. (1995) Reinforced concrete slabs externally strengthened with fibre-reinforced plastic materials, in: *RILEM Proceedings, CHAPMAN and HALL*, pp. 509–509.

Esfahani, M. R., Kianoush, M. R., & Moradi, A. R. (2009). Punching shear strength of interior slab column connections strengthened with carbon fiber reinforced polymer sheets. *Engineering Structures*, 31(7), 1535–1542. doi: 10.1016/j.engstruct.2009.02.021

Eurocode 2: Design of concrete structures – Part 1–6: General rules and rules for buildings. European pre-standard. European committee for standardization, 2004, p. 253.

Faria, D. M., Einpaul, J., P. Ramos, A. M., Fernández Ruiz, M., & Muttoni., A. (2014). On the efficiency of flat slabs strengthening against punching using externally bonded

fibre reinforced polymers. *Construction and Building Materials*, 73, 366-377. doi: 10.1016/j.conbuildmat.2014.09.084

Foret, G., & Limam, O. (2008). Experimental and numerical analysis of RC two-way slabs strengthened with NSM CFRP rods. *Construction and Building Materials*, 22(10), 2025-2030. Do: 10.1016/j.conbuildmat. 2007.07.027

Genikomsou, A. & Polak, M. (2015). Finite element analysis of punching shear of concrete slabs using damaged plasticity model in ABAQUS. *Engineering Structures*. DOI: 98. 10.1016/j.engstruct.2015.04.016.

Gerd, B., & Walter, H. D. (2008) "Influence of Slab Thickness on Punching Shear Strength". *Structural Journal*, 105(2). doi: 10.14359/19733

Gherdaoui, M. & Guenfoud, M. (2018) Repairing reinforced concrete slabs by composite materials, *Journal of Materials and Environmental Sciences*, Volume 9, Issue 2, pg 701-708.

Grassl, P., Xenos, D., Nyström, U., Rempling, R. & Gylltoft, K. (2013) A damage-plasticity approach to modelling the failure of concrete, *International Journal of Solids and Structures*, Volume 50, Issue 24, 2013, Pages 3805-3816, doi.org/10.1016/j.ijsolstr.2013.07.008.

Harajli, M. H., and Soudki, K. A. (2003). "Shear strengthening of interior slab-column connections using carbon fiber-reinforced polymer sheets" *J. Compos. Constr.*, 7(2), 145 –153

Harajli, M. H., Soudki, K. a., & Kudsi, T. (2006). Strengthening of Interior Slab–Column Connections Using a Combination of FRP Sheets and Steel Bolts. *Journal of Composites for Construction*, 10(5), 399–409. [https://doi.org/10.1061/\(ASCE\)1090-0268\(2006\)10:5\(399\)](https://doi.org/10.1061/(ASCE)1090-0268(2006)10:5(399))

Heinzmann, D., Etter, S., Villiger, S. & Taeger, T. (2012) Punching tests on reinforced concrete slabs with and without shear reinforcements, *ACI Struct. J.* 109 (6) pg 787–794.

Inacio, M. M. G., Almeida, A. F. O., Faria, D. M. V., Lúcio, V. J. G., & Ramos, A. P. (2015). Punching of high strength concrete flat slabs without shear reinforcement. *Engineering Structures*, 103, 275-284. doi: 10.1016/j.engstruct.2015.09.010

Inacio, M. M. G., Ramos, A. P. & Lucio, V. (2013). Punching of High Strength Concrete Flat Slabs – Experimental Investigation. *FIB symposium*, DOI: 10.13140/2.1.3251.5849

Johansen, K. W. (1962) "Yield Line Theory", Cement and Concrete Association, London, England.

Jumaat, M. Z. & Alam, M. D. A. (2010). Experimental and Numerical Analysis of End Anchored Steel Plate and CFRP Laminate Flexurally Strengthened Reinforced Concrete Beams. *International Journal of the Physical Sciences*, Vol. 5 (2), pp. 1 32-1 44, February, 2010.

Koppitz, R., Kenel, A., & Keller, T. (2013). "Punching shear of RC flat slabs – Review of analytical models for new and strengthening of existing slabs". *Engineering Structures*, 52, 123-130. doi: 10.1016/j.engstruct.2013.02.014.

Lips, S., Ruiz, M. F. & Muttoni, A. (2012) Experimental investigation on punching strength and deformation capacity of shear reinforced slabs, *ACI Struct. J.* 109 (6) pg 889–900.

Malalanayake, M.L.V.P., Gamage, J.C.P.H. &Silva, M.A.L. (2017) "Experimental Investigation on Enhancing Punching Shear Capacity of Flat Slabs Using CFRP". *8th International Conference on Structural Engineering and Construction Management (ICSECM2017)*, Kandy, Sri Lanka.

Marzouk H, Hussein A. (1991) "Experimental investigation on the behavior of high strength concrete slabs". *ACI Structural Journal*. 1991;88(6):701–13.

Meisami, M. H., Mostofinejad, D. and Nakamura, H. (2014) "Strengthening of flat slabs with FRP fan for punching shear", *Composite Structures*, doi.org/10.1016/j.compstruct.2014.08.041.

Metwally, I.M., Issa, M.S. & El-Betar, S. A. (2008). Punching Shear Resistance of Normal and High Strength Reinforced Concrete Flat Slabs, *Civil Engineering Research Magazine*, Vol:3, 2008.10.03.

Mohammed, A., Al-Saadi, N. T. K., & Al-Mahaidi, R. (2017). Assessment of bond strength of NSM CFRP strips embedded in concrete using cementitious adhesive made

with graphene oxide. *Construction and Building Materials*, 154, 504-513. doi: 10.1016/j.conbuildmat.2017.07.238

Mohee, F. M., & Al-Mayah, A. (2016). Development of an innovative prestressing CFRP plate anchor: Numerical modelling and parametric study. *Composite Structures*, 177, 1-12. doi: 10.1016/j.compstruct.2016.12.039

Mohee, F. M., Al-Mayah, A., & Plumtree, A. (2017). Development of a novel prestressing anchor for CFRP plates: Experimental investigations. *Composite Structures*, 176, 20-32. doi: 10.1016/j.compstruct.2017.05.011

Mowrer, R. D., & Vanderbilt, M. D. (1967) Shear Strength of Lightweight Aggregate Reinforced Concrete Flat Plates. *Journal Proceedings*, 64(11). doi: 10.14359/7601

Nandeesh, M., Reddy, A. R. P. & Prabhakara, R. (2016). "Investigations on Effect of CFRP Strips Retrofitted using NSM Method on Two-Way NSC And HSC Slabs Subjected to Concentrated Load". *International Journal of Research in Engineering and TechnologyeISSN: 2319-1163 | pISSN: 2321-7308*

Paiva, O. S., Ferreira, M. P., Oliveira, D. R. C., Lima Neto, A. F., & Teixeira, M. R.. (2015). Influence of the column rectangularity index and of the boundary conditions in the punching resistance of slab-column connections. *Revista IBRACON de Estruturas e Materiais*, 8(3), 260-295. <https://dx.doi.org/10.1590/S1983-41952015000300003>

Ribeiro, M., Ferreira, A. & Marques, A. (2003). Analysis and Experiments on FRP-Polymer Concrete Hybrid Beams. *Journal of Polymer Engineering*. 23. 337-351. 10.1515/POLYENG.2003.23.5.337.

Robertson, I. & Johnson, G. (2004). Repair of Slab–Column Connections Using Epoxy and Carbon Fiber Reinforced Polymer. *Journal of Composites for Construction - J COMPOS CONSTR.* 8. 10.1061/(ASCE)1090-0268(2004)8:5(376).

Ruiz, M. F. & Muttoni, A. (2009) Application of critical shear crack theory to punching of reinforced concrete slabs with transverse reinforcements, *ACI Struct. J.* 106 (4) (2009) 485–494.

Silva, M.A.L., Madushanka, W.I., Ariyasena, P.S.I. & Gamage, J.C.P.H (2018) Punching Shear Capacity Enhancement of Flat Slabs using End Anchored Externally Bonded CFRP. Society of Structural Engineers Sri Lanka, MODULUS, vol:28 (2)

Sissakis, K. & Sheikh, S. A. (2007) "Strengthening concrete slabs for punching shear with carbon fiber-reinforced polymer laminates". *ACI Structural Journal* (49-59)

Smith, S. T., Rasheed, H. A., & Kim, S. J. (2017). Full-range load-deflection response of FRP-strengthened RC flexural members anchored with FRP anchors. *Composite Structures*, 167, 207-218. doi: 10.1016/j.compstruct.2017.02.002

Smith, S. T., Zhang, H., & Wang, Z. (2013). Influence of FRP anchors on the strength and ductility of FRP-strengthened RC slabs. *Construction and Building Materials*, 49, 998-1012. doi: 10.1016/j.conbuildmat.2013.02.006

Soudki, K., El-Sayed, A. K., & Vanzwol, T. (2012). Strengthening of concrete slab-column connections using CFRP strips. *Journal of King Saud University - Engineering Sciences*, 24(1), 25–33. <https://doi.org/10.1016/j.jksues.2011.07.001>

Tassinari, L., Ruiz, M. F., Muttoni, A. & Sagaseta, J. (2011). Non-axis-symmetrical punching shear around internal columns of RC slabs without transverse reinforcement. *Magazine of Concrete Research*. 63. 441-457. 10.1680/macr.10.00098

Ullah, H., Harland, A.R., Lucas, T., Price, D. & Silberschmidt, V. (2011). Analysis of nonlinear deformations and damage in CFRP textile laminates. *Journal of Physics: Conference Series*. 305. 012045. 10.1088/1742-6596/305/1/012045.

Utomo, B. D. H., van der Meer, B. J., Ernst, L.J. & Rixen, D.J. High-speed impact modelling and testing of dyneema composite. The Proceeding of the 11th international conference on mechanics and technology of composite materials, October 2–4, Sofia, Bulgaria; 2006.

X wrap lamination adhesive (2019) Available at: <http://www.x-calibur.us/files/X-Wrap%20Lamination%20Adhesive.pdf> (Accessed: 5th of August, 2017).

X-Roc Latex (2019) Available at: <https://www.x-calibur.us/files/X-Roc%20Latex.pdf>. (Accessed at: 16th October, 2019)

X-Roc Mocrocrete (2019) Available at: <https://www.x-calibur.us/files/X-Roc%20MicroCrete.pdf> (Accessed: 15th of October, 2019)

X-Roc Ultra Patch (2018) Available at: <https://www.x-calibur.us/files/X-Roc%20UltraPatch.pdf> (Accessed: 1st of July, 2018).

X-Wrap c300 (2019) Available at: <http://www.x-calibur.us/files/X-Wrap%20C300.pdf> (Accessed: 21st of January, 2018).

Zhang, H. W., & Smith, S. T. (2012). FRP-to-concrete joint assemblages anchored with multiple FRP anchors. *Composite Structures*, 94(2), 403-414. doi: 10.1016/j.compstruct.2011.07.025