



UNIVERSITY OF LEEDS

This is a repository copy of *Time-dependent behaviour of cracked, partially bonded reinforced concrete beams under repeated and sustained loads*.

White Rose Research Online URL for this paper:
<http://eprints.whiterose.ac.uk/127691/>

Version: Accepted Version

Article:

Daud, SA, Forth, JP and Nikitas, N orcid.org/0000-0002-6243-052X (2018)

Time-dependent behaviour of cracked, partially bonded reinforced concrete beams under repeated and sustained loads. *Engineering Structures*, 163. pp. 267-280. ISSN 0141-0296

<https://doi.org/10.1016/j.engstruct.2018.02.054>

© 2018 Elsevier Ltd. This manuscript version is made available under the CC-BY-NC-ND 4.0 license <http://creativecommons.org/licenses/by-nc-nd/4.0/>

Reuse

This article is distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND) licence. This licence only allows you to download this work and share it with others as long as you credit the authors, but you can't change the article in any way or use it commercially. More information and the full terms of the licence here: <https://creativecommons.org/licenses/>

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



eprints@whiterose.ac.uk
<https://eprints.whiterose.ac.uk/>

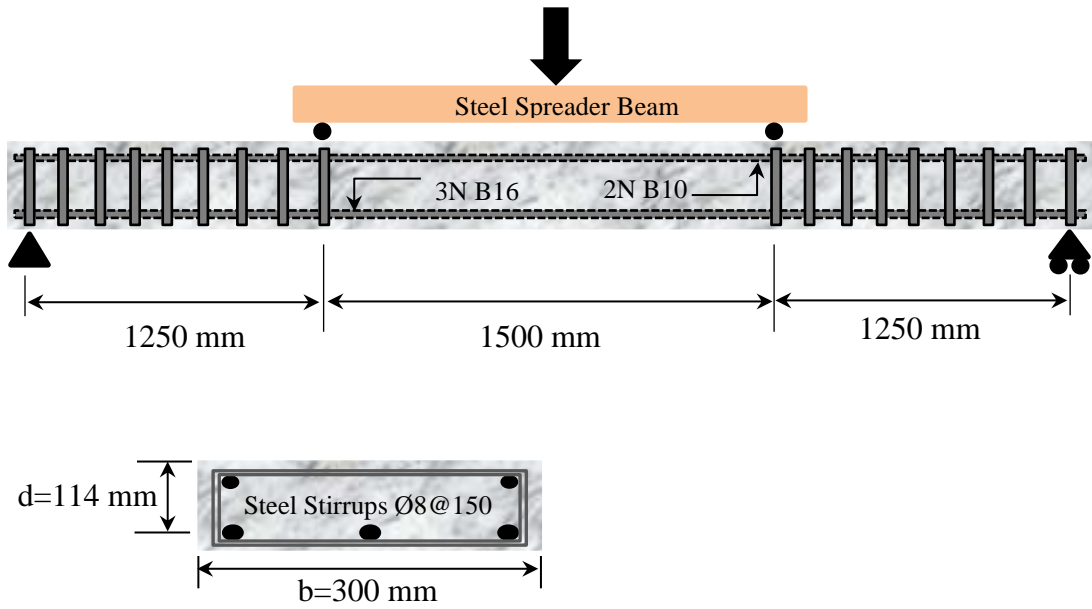


Figure 1: Specimen dimensions, reinforcement and experimental set-up

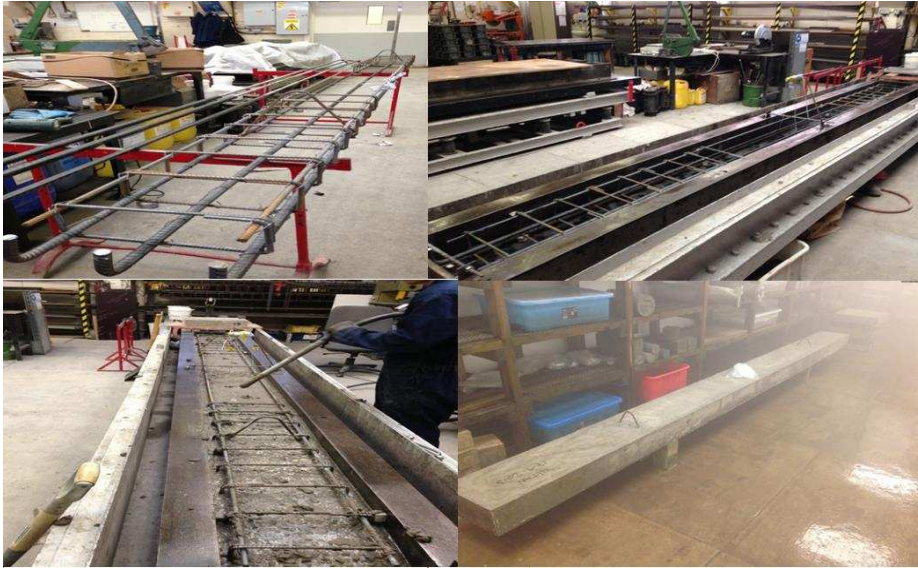


Figure 2: Beam casting arrangement



Figure 3: Beam test setup



Figure 4: Beam test setup

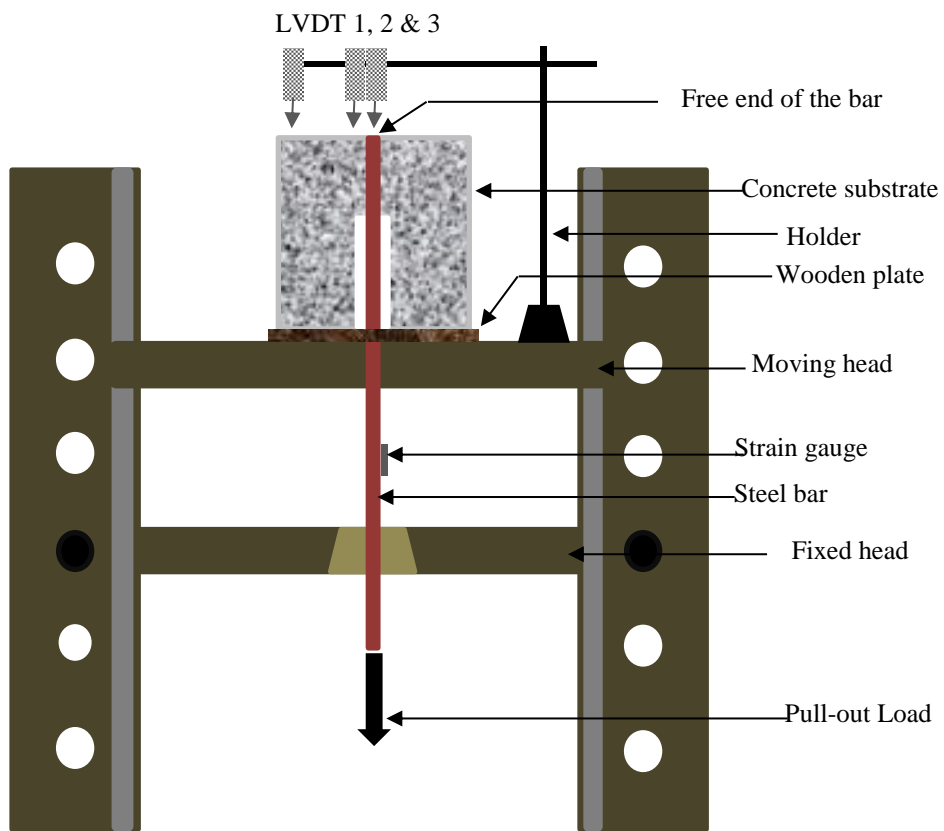


Figure 5: Test setup for pull-out test

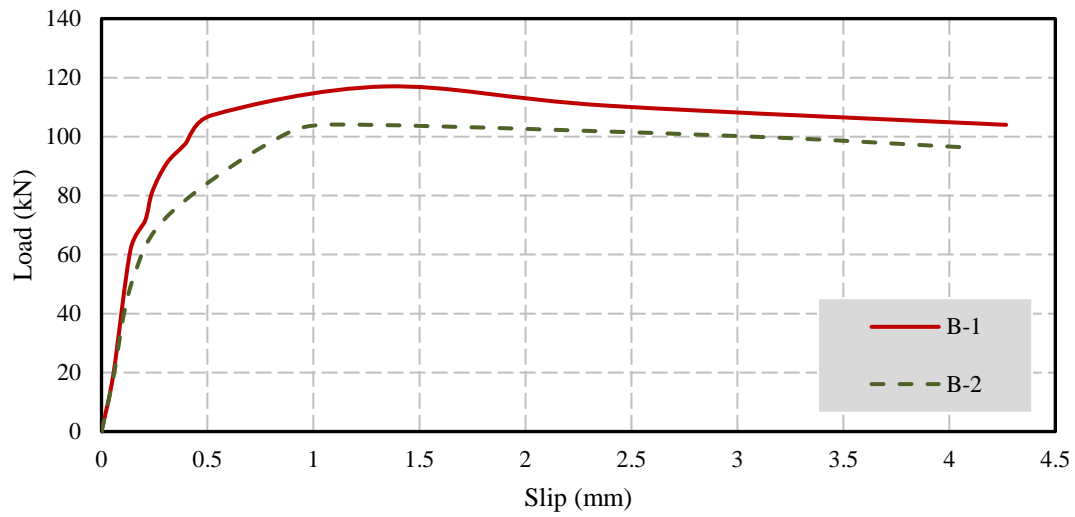


Figure 6: Load-slip behaviour of reinforced concrete bonded samples

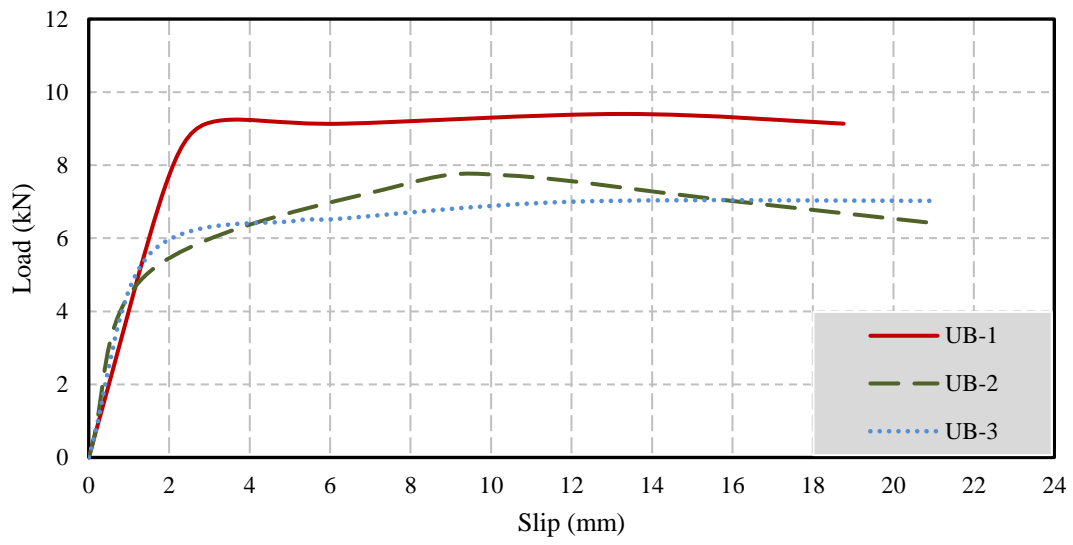


Figure 7: Load-slip behaviour of reinforced concrete unbonded samples



(a)

(b)

Figure 8: Failure mode through pull-out test a) bonded samples, b) unbonded samples

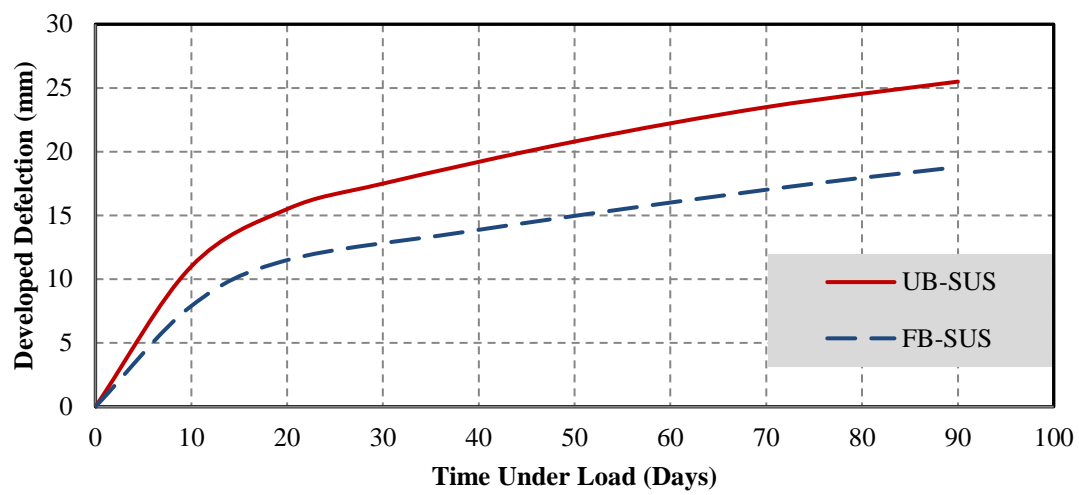


Figure 9: Developed mid-span deflection with time (UB-SUS and FB-SUS)

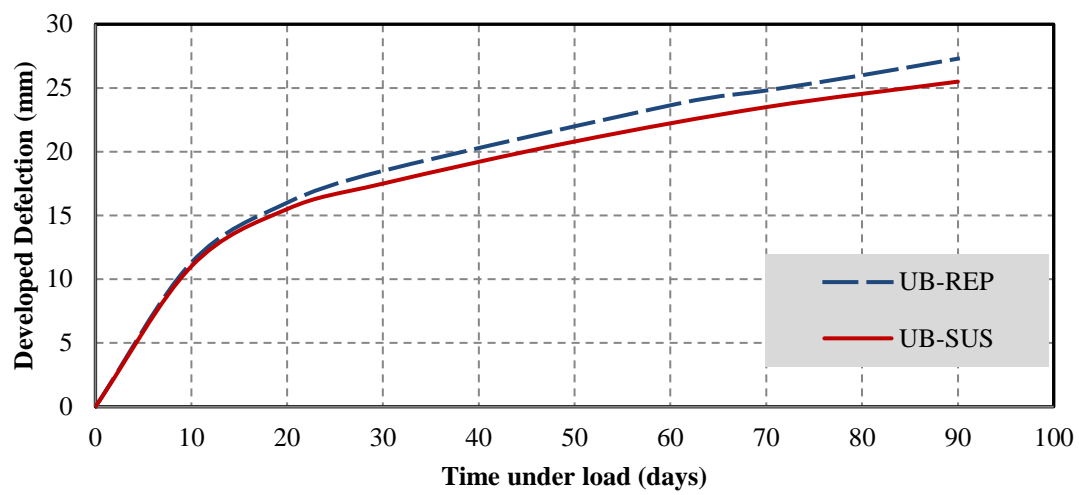


Figure 10: Developed mid-span deflection with time (UB-REP and UB-SUS)

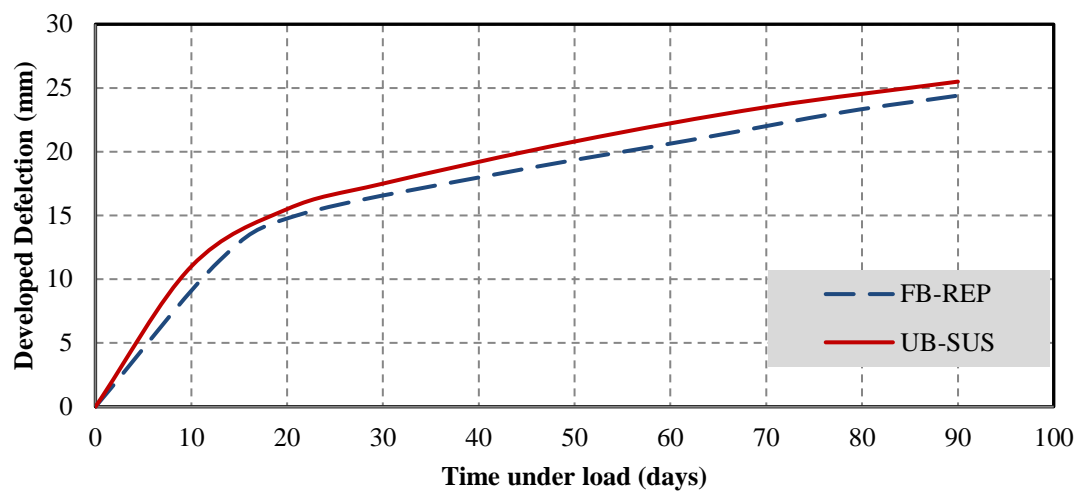


Figure 11: Developed mid-span deflection with time (FB-REP and UB-SUS)

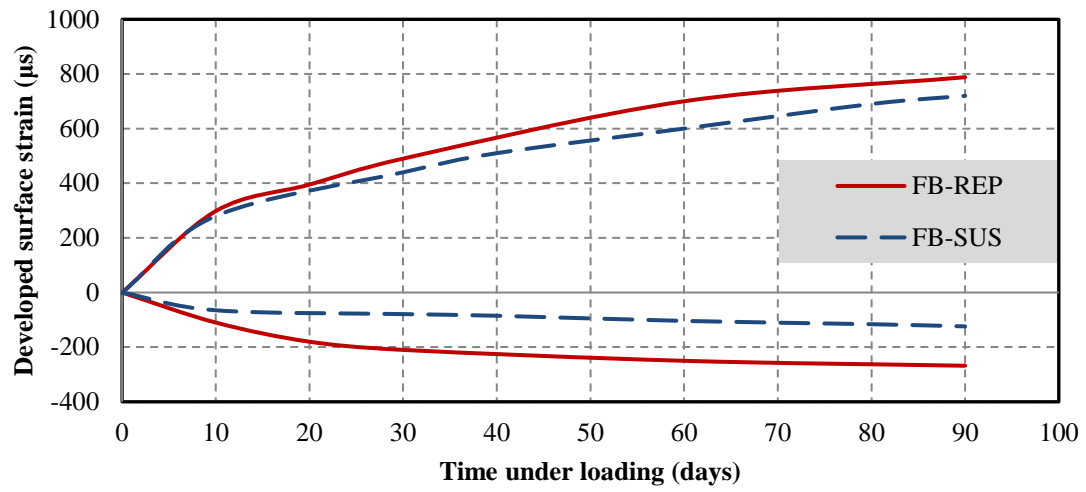


Figure 12: Surface strain development in the compression and tension zone with time (FE-B and FB-SUS)

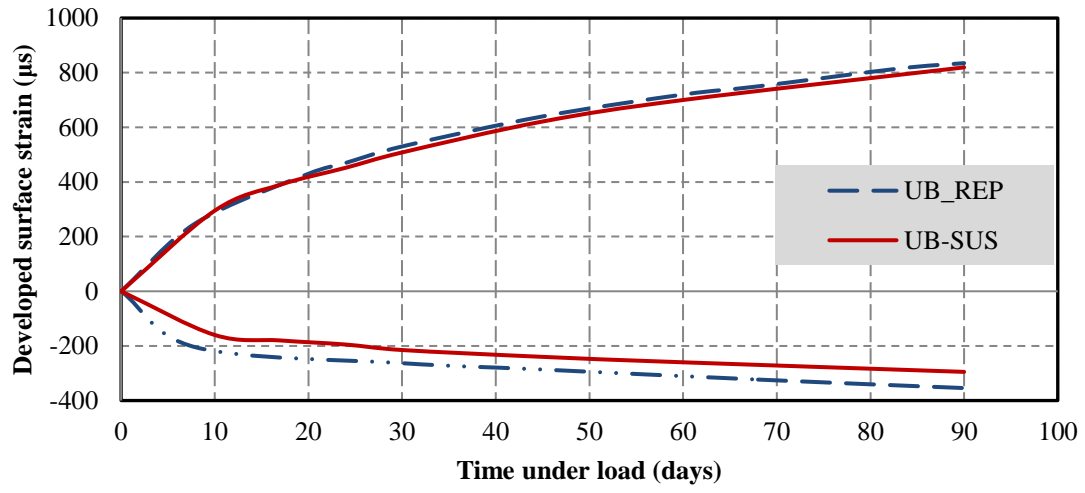


Figure 13: Surface strain development in the compression and tension zone with time (UB-REP and UB-SUS)

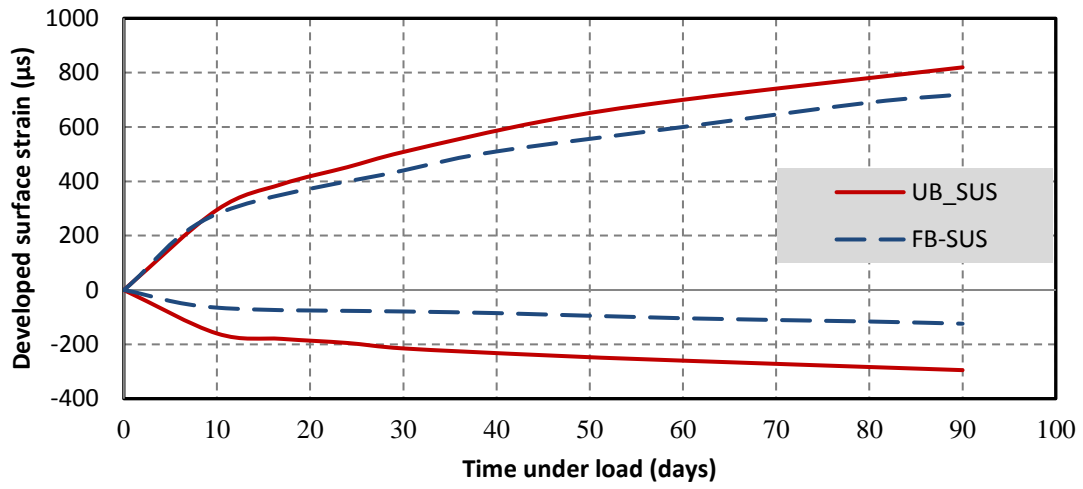


Figure 14: Surface strain development in the compression and tension zone with time (UB-SUS and FB-SUS)

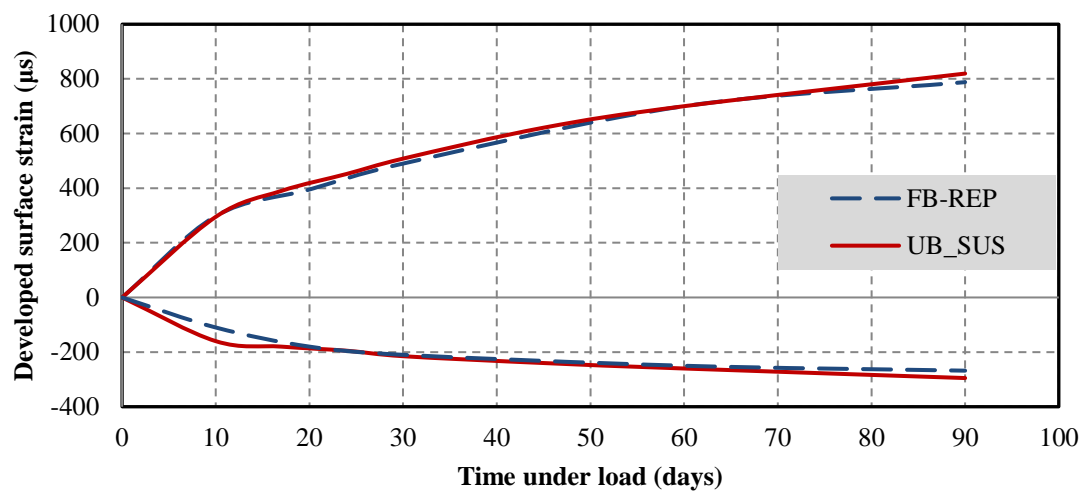


Figure 15: Surface strain development in the compression and tension zone with time (FB-REP and UB-SUS)

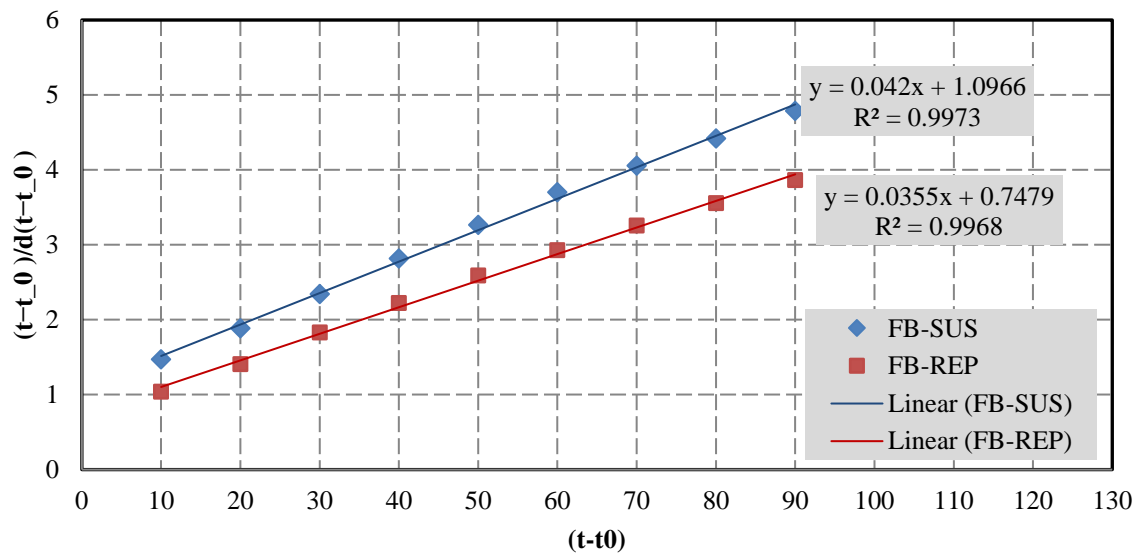


Figure 16: Hyperbolic relations proposed by Ross (FB-SUS and FB-REP)

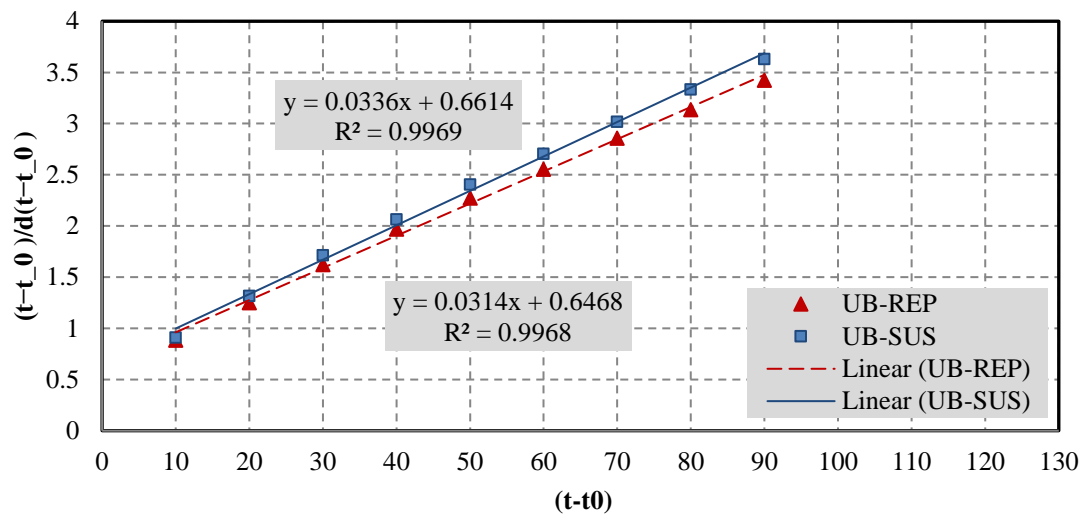


Figure 17: Hyperbolic relations proposed by Ross (UB-SUS and UB-REP)

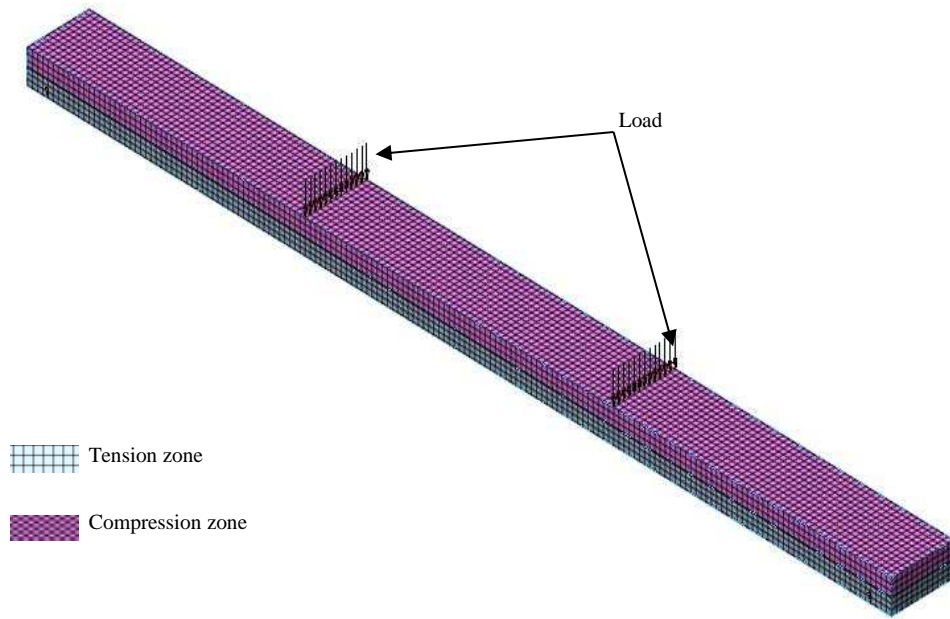


Figure 18: Beam model - Midas FEA

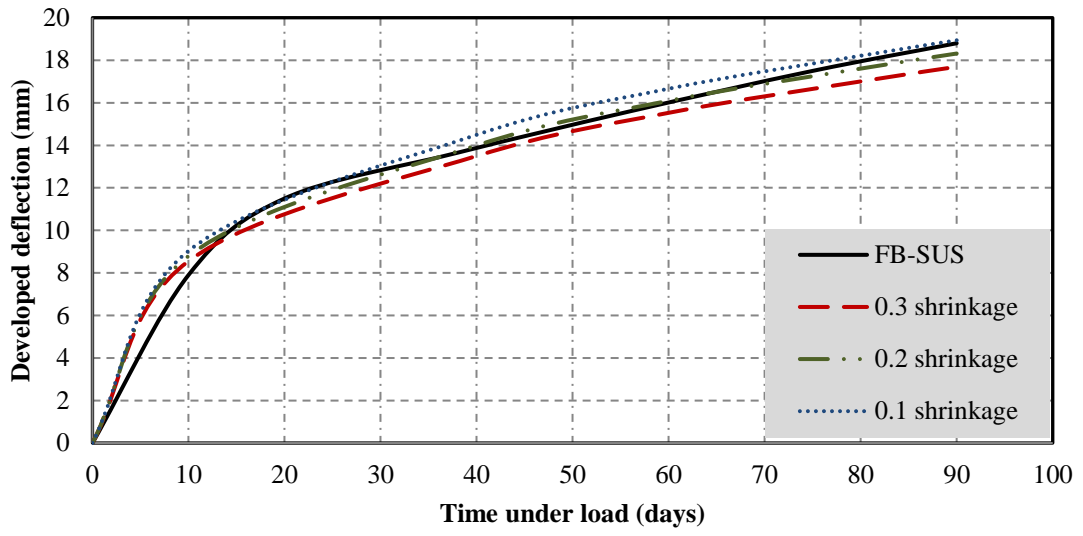


Figure 19: Mid-span developed deflection vs. time under load

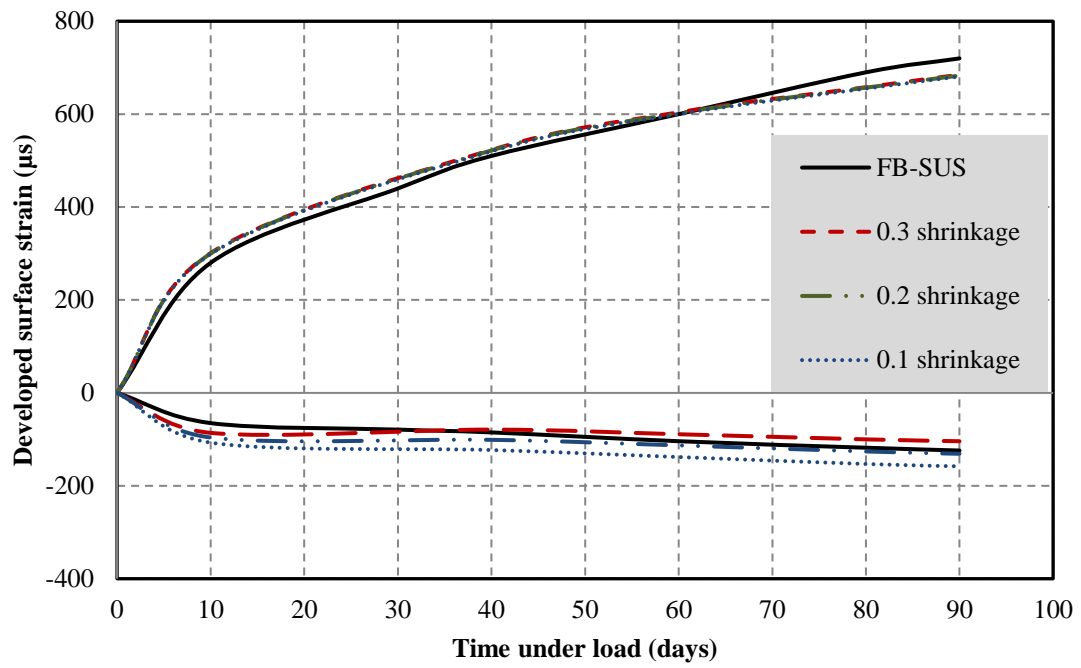


Figure 20: Strain development vs. time under load

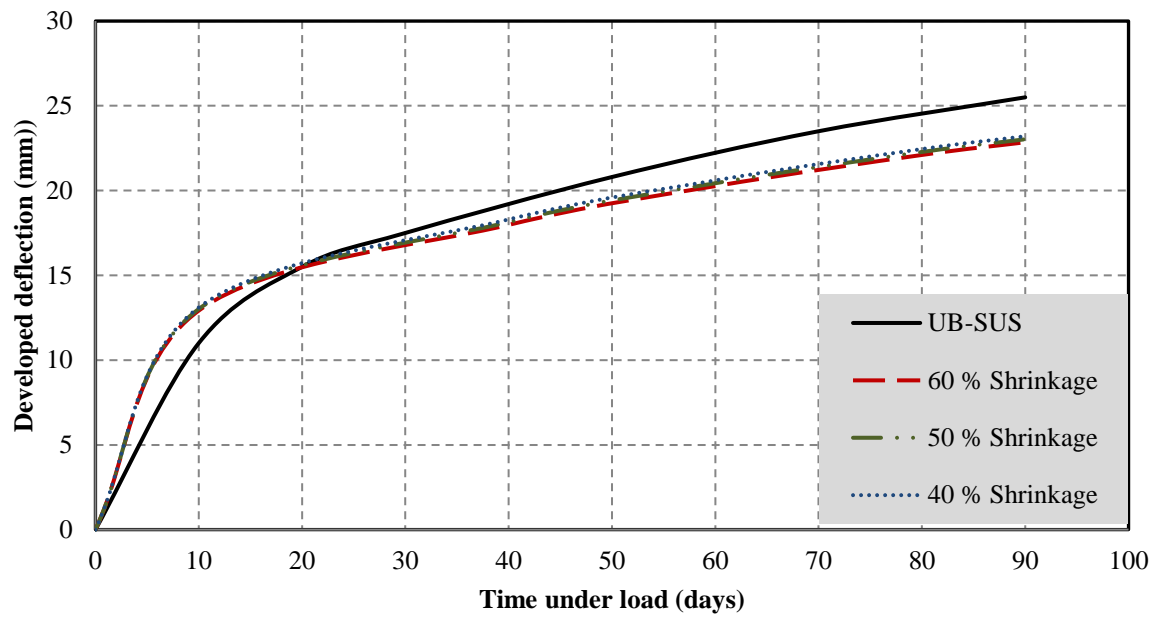


Figure 21: Mid-span developed deflection vs. time under load

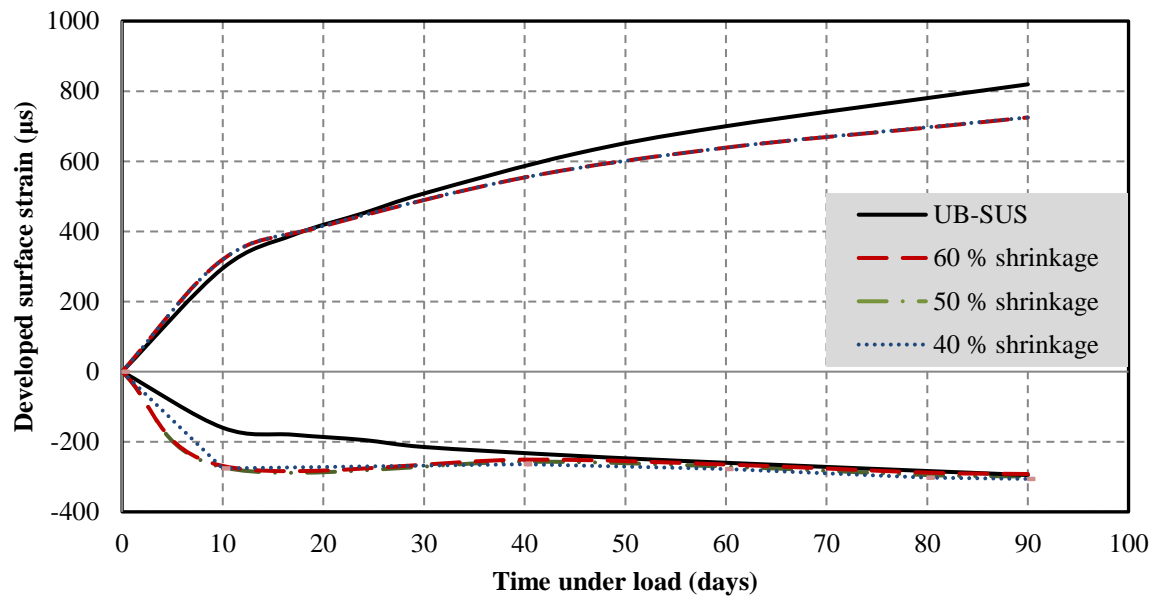


Figure 22: Strain development vs. time under load

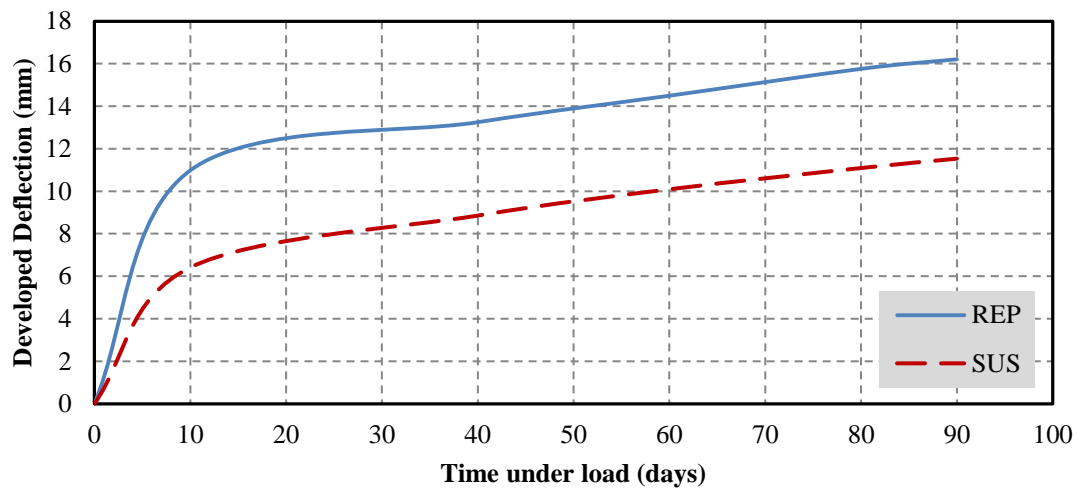


Figure 23: Mid-span deflection due to lose of tension stiffening