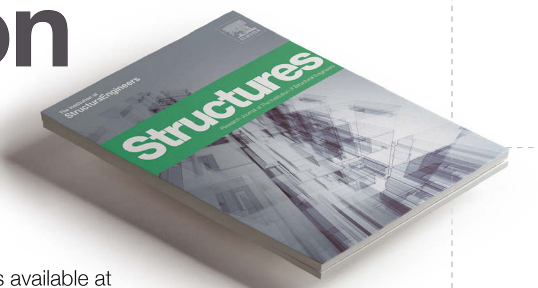
Access to *Structures* is free to paying-grade Institution members as one of their membership benefits, via the 'My account' section of the Institution website. The journal is available online at: **www.structuresjournal.org**

Spotlight on *Structures*



Read the latest issue

The latest issue of Structures (Volume 26, August 2020) is available at www.sciencedirect.com/journal/structures/vol/26.

Editor-in-Chief, Leroy Gardner, has selected two 'Featured Articles' from this issue. Both will be available free of charge for six months.

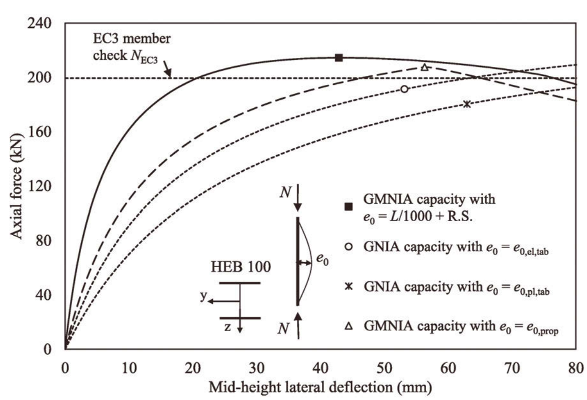
Editor-in-Chief's Featured Articles

Equivalent bow imperfections for use in design by second order inelastic analysis

F. Walport, L. Gardner and D.A. Nethercot
Imperial College London, London, UK

The stability of compression members is typically assessed through buckling curves, which include the influence of initial geometric imperfections and residual stresses. Alternatively, the capacity may be obtained more directly by carrying out either an elastic or an inelastic second order analysis using equivalent bow imperfections that account for both geometric imperfections and residual stresses. For design by second order elastic analysis, following the recommendations of EN 1993-1-1, the magnitudes of the equivalent bow imperfections can either be back-calculated for a given member to provide the same result as would be obtained from the member buckling curves or can be taken more simply as a fixed proportion of the member length. In both cases, a subsequent M–N (bending + axial) cross-section check is also required, which can be either linear elastic or linear plastic. For design by second order inelastic analysis, also referred to as design by geometrically and materially nonlinear analysis with imperfections (GMNIA) there are currently no suitable recommendations for the magnitudes of equivalent bow imperfections and, as demonstrated herein, it is not generally appropriate to use equivalent bow imperfections developed on the basis of elastic analysis. Equivalent bow imperfections suitable for use in design by second order inelastic analysis are therefore established in the present paper. The equivalent bow imperfections are calibrated against benchmark FE results, generated using geometrically and materially nonlinear analysis with geometric imperfections of $L/1000$ (L being the member length) and residual stresses. Based on the results obtained, an equivalent bow imperfection amplitude $e_0 = \alpha L/150$ (α being the traditional imperfection factor set out in EC3), is proposed for both steel and stainless steel elements and shown to yield accurate results. The reliability of the proposed approach is assessed, using the first order reliability method set out in EN 1990, against the benchmark FE ultimate loads, where it is shown that partial safety factors of 1.0 for steel and 1.1 for stainless steel can be adopted.

→| Read the full paper at **https://doi.org/10.1016/j.istruc.2020.03.065**

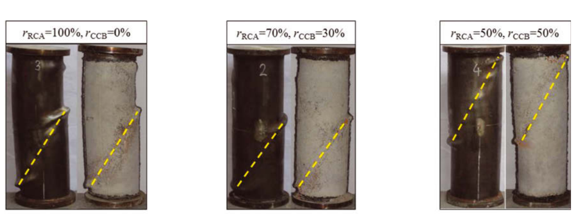


Axial compressive behavior of recycled concrete filled steel tubular stub columns with the inclusion of crushed brick

Jie Chen[a,b], Sumei Zhang[b], Yuyin Wang[c,d], Yue Geng[c,d]
[a] China Construction Science and Industry Corporation Ltd., Shenzhen, China
[b] Harbin Institute of Technology, Shenzhen, China
[c] Key Lab of Structures Dynamic Behavior and Control of the Ministry of Education (Harbin Institute of Technology), Harbin, China
[d] Harbin Institute of Technology, Harbin, China

In China, due to the extensive use of brick as the non-structural walls in the old concrete building, it is hard to exclude the waste brick from the waste concrete in the production of recycled coarse aggregates. This paper investigates the axially loaded recycled aggregate concrete filled steel tubes with the inclusion of crushed bricks as the coarse aggregates, which is called as the recycled brick aggregate concrete filled steel tubes (RBACFSTs). It was found that the compressive resistance only decreased by up to 3.8% when half of the recycled coarse aggregate was substituted by the crushed clay brick (CCB). The structural effects of the CCB replacement are much smaller than the corresponding effects in the material property tests, owing to the confinement effects. The stress states of the steel and the concrete infill were analyzed separately. Model equations to describe the stress–strain responses and the design recommendations for RBACFSTs were proposed.

→| Read the full paper at **https://doi.org/10.1016/j.istruc.2020.03.045**



a) RACFST-c b) RBACFST-30-a c) RBACFST-50-b