An experimental investigation of the flexural strength of soda–lime–silica glass at high loading rates

A novel ring-on-ring test setup was developed for investigating the biaxial flexural strength of small circular soda–lime–silica glass specimens at high loading rates in a high-speed test rig. Such rate effects become important when designing for extreme events such as impact and blast, which are highly relevant for glass used in e.g. façades. The investigation focused on two groups of specimens with different surface conditions: as-received and pre-damaged with a well-defined flaw. A total of 151 specimens were tested in order to evaluate the influence of loading rate and surface condition on the flexural strength. Quasi-static and dynamic experiments were performed at loading rates ranging between 2 and 5.6 × 106 MPa/s. An 85% increase in strength with loading rate was observed for the ‘as-received’ specimens and 52% for the ‘pre-damaged’.

General information
Publication status: Accepted/In press
Organisations: Structures and Safety, Department of Civil Engineering, Solid Mechanics, Department of Mechanical Engineering, Technical University of Denmark
Contributors: Meyland, M. J., Bønding, C. K. T., Eriksen, R. N., Nielsen, J.
Publication date: 2019
Peer-reviewed: Yes

Publication information
Journal: Glass Structures & Engineering
ISSN (Print): 2363-5142
Ratings:
Web of Science (2019): Indexed yes
Original language: English
Keywords: Soda–lime–silica glass, High loading rates, Strain rates, Ring-on-ring test, Dynamic
DOIs:
10.1007/s40940-018-0089-2
Source: FindIt
Source-ID: 2440576880
Research output: Contribution to journal › Journal article – Annual report year: 2019 › Research › peer-review