Changes Report

Author of the Article:
Anna Rzepka, Dominika Ziaja

Article Name:
Using the DIC Technique in Damage Detection for a Cantilevered Composite Beam

Revision

Dear Editors,

I want to inform you that I am sending the revised version of the article. Attached are two versions: one with highlighted and another without. Below, I am also sending responses to the reviewers.

Best regards,
Anna Rzepka

1. Response to the first reviewer (Prof. Dr. Juncai Xu, Hohai University)

Dear Professor Dr. Juncai Xu,

I want to express my gratitude for the review you provided. I tried to answer your comments to the best of my ability and incorporated them into the revised version of the article (corrections have been made in the text highlighted in blue).

In response to your comment regarding the composite material and its production process, I would like to clarify that the exact material properties and production process are unknown. After visual examination, based on the beam's natural colour, and fibre orientation as well as the damage mechanism we supposed, with a high probability, that the specimen is the pultrusion beam made of GFRP, as specified in the text of the article. Due to the lack of exact data, in our examination, we used material properties (such as specific gravity, longitudinal elastic modulus, and Poisson’s ratio) collected in manufacturer catalogues. The satisfactory compliance between the numerical model and experimental results suggests that our supposition was right, however further numerical simulation will be made to identify the exact material properties. The prediction of real properties of material embedded into the structure is one of the typical tasks in the field of numerical model updating, it is one of the so-called inverse problems. In our case, it will be studied in the future.

In my master's thesis, on which this article is based, the numerical modelling of the damaged beam has not been considered. It is also a task, which will be considered in the future. The authors plan to build the FEM shell model with parametrically described damage location and size with the aim of structural health monitoring (SHM) problems solving. Utilizing artificial neural networks, genetic algorithms, and more advanced computer software than those applied in this study are planned.

In summary, I would like to emphasize that in the article, I have included information about the adopted material parameters (the last paragraph, section no. 2) and expanded the descriptions of the figures to make them more visible, following the guidelines. I trust that I have addressed the most crucial matters.

Once again, I appreciate your constructive feedback.

Best regards,

Anna Rzepka
2. Response to the second reviewer (Mr. Ed Ginzel, Adjunct Advisor, University of Waterloo)

Dear Mr. Ed Ginzel,

thank you for the provided review. All your comments have been incorporated into the revised version of the article (corrections have been made in the text highlighted in green). Regarding your concern about the number of images and series, I want to clarify that each of the twenty measurement series for the undamaged beam (S01-S10 for the anchorage zone, and S11-S20 for the whole beam) and five series for the damaged model (each corresponding to one damage scenario) consisted of several distinct images (about 10 for each camera: the first one - without loading and each subsequent one after the next increase in load). In the case of an undamaged beam, the approach with measurement repetition in 10 series was taken to check the examinations were repeatable. The fourth paragraph in section no. 2 was modified.

The clarification of the damage mechanism was added to the second paragraph of section no. 2: "The research scenario involved inducing damage to one selected cross-section of the beam by gradually weakening it using a device oscillating. Weakening started from the bottom flanch (in two steps) then the top flanch was cut (also in two steps), and at the end, the notch in the web was made (one-fifth of height from the bottom and the top). Selected damages are shown in Figures 1b and 1c."

Additionally, concerning the absence of information regarding displacements along the z-axis, I would like to inform you that the drawings (Figures 2, 3 and 5) have been updated to show the corrected coordinate system accurately.

Thank you once again for your constructive feedback.

Best regards,
Anna Rzepka