# Simple model for inverse estimation of material parameters from three-point bending tests

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## Abstract

Laboratory experiments provide large amount of data, and using measurements for estimation of material parameters is becoming increasingly important. The experimentally obtained data can usually be linked to a mathematical model that appropriately links effects various parameters with the global response of the tested medium. Model developed for this research is based on simple beam theory, a fractured cross section divided into layers [1], and steel and concrete behaviour equations that differ in tension and compression. Both equation contain the unknown material parameters, for which optimal values are determined by testing from a set of solutions.
Three-point bending tests were conducted on a total of nine beams; dimensions 70 x 70 x 280 mm with 210 mm span between supports; with and without steel fibers placed in a row in a notch. The results of bending were force-displacement curves recorded until beam failure from which the post-peak behavior is determined. Three parameters were recorded during the experiments: deflection, crack opening deflection (CMOD) and the loading force. All data were recorded together with the magnitude of the time step.
Verification of the model is done using a parametric analysis. At this stage of the research, it is important to obtain numerical results that are mathematically similar to the experimental data. Further work will include appropriate inverse methods to estimate the relevant parameters, similar to [2].

## Keywords

*Three-point bending, fiber reinforced concrete, mathematical model, parameter estimation*

## References

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