

A NEW APPROACH FOR IMPERFECT BOUNDARY CONDITIONS OF THE DYNAMIC BEHAVIOUR

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ABSTRACT

Real beams have non-ideal boundary conditions and it is necessary to use new models to determine the real modal parameters. Models that use ideal conditions do not fully reflect reality and can lead to unsatisfactory description of the dynamic behaviour. The hinged – hinged boundary conditions, which is in the focus of the paper, are not analyzed as a single beam, but as a continuous beam with three spans, free at the ends. The continuous beam with three spans is analyzed for cases in which the intermediate supports can occupy any position along the length of the beam, by an analytical solution of the problem, with the example of cases when the intermediate supports are located very close at the free ends of the continuous beam, thus simulating the real case for an hinged beam at both ends; the situation in which the intermediate supports are very close to one of the ends of the beam, thus simulating the real case of the clamped beam, with an imperfect clamped end; and the situation in which the intermediate supports are very close located anywhere on the beam length, thus simulating the ipotetic case with a continuous beam free at the ends and fix on the hinged supports. The analytic results are compared with numerical results by using finite elements method.