

N.º 04

dispBeamColumn or forceBeamColumn: the element that moves your shear by 56%

OpenSees lets you model a column with two element types that look equivalent. Against a real test, one got the shear within 1% and the other overshoot by 56%. I explain why, starting from the basic idea.

1.

Two elements that look alike

In OpenSees, `dispBeamColumn` and `forceBeamColumn` take the same fiber section. But they describe the column differently.

2.

Against the test

+1% vs +56%

Peak shear error against PEER column 415.
forceBeamColumn first, a single
dispBeamColumn second.

3.

The reason

dispBeamColumn forces curvature to be a straight line inside the element. The plastic hinge is a spike. A straight line cannot draw a spike.

4. What I check now

I validate the same element and mesh I will use in the batch, against a test. Never an "equivalent" version.

Full note, with equations and tables, at the link on my profile.

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