

N.^o 03

You do not design the cap beam with the reduced force:
capacity protection

In seismic design we choose which part of the bridge gets damaged, like a fuse. Everything else is designed for what that fuse can transmit. In a two-column bent, that is almost twice what the analysis says.

1.

The column is the fuse

We choose for damage to happen in the column, where we can confine and repair. Cap beam, joint and foundation must stay intact.

2.

What the analysis says

$\approx 2,600 \text{ kN}\cdot\text{m}$

Moment at each column top with the seismic force divided by R.

3.

What the column
delivers

$\approx 4,800 \text{ kN}\cdot\text{m}$

Its real strength (4,000 kN·m) times 1.2
overstrength. Almost double.

4.

What gets designed with it

Cap beam, joint, foundation and the column shear itself. Everything that must not be damaged.

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

Yordan Rocio Maldonado

Structural engineer, seismic and bridge specialist

CIP 215845