

Seismic Design of Flared Columns

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The California Department of Transportation (Caltrans) has sponsored work at the University of Nevada, Reno to test ways to improve the behavior of flared columns. The primary method is by isolating the flare from the rest of the structure by using gaps. Two gap configurations were used. One was a horizontal gap at the top of the column while the other was a horizontal gap in combination with a vertical gap along the core of the column. The impact of the amount of flare reinforcement was also considered. This was done through the testing of five two-column bents. The columns were flared at that top and hinged at the bottom. Three bents had tall columns and two had short columns to vary the level of shear demand in the columns. In addition to the experimental work, analytical work was conducted using simple hysteretic models, strut-and-tie models as well as a finite element package called DIANA. The combination of the experimental work and the analysis will provide bridge engineers with guidance as to how to design flares in bridge columns for certain performance levels.