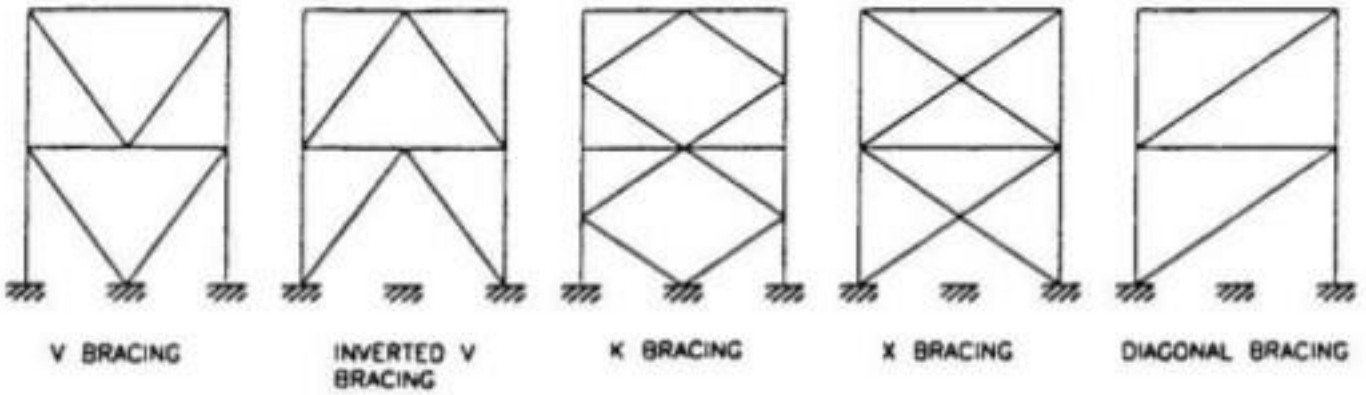
Issue with one entry in Table 15.4-1

Table 15.4-1
"Similar" Nonbuilding Structure Options
Steel Ordinary Concentrically Braced Frames

System	Detailing	R	Ω_O	Height Limit (ft.)				
				B	C	D	E	F
Steel OCBFs	AISC 341	3.25	2	NL	NL	35	35	NP
With Permitted Height Increase	AISC 341	2.5	2	NL	NL	160	160	100
With Unlimited Height	AISC 360	1.5	1	NL	NL	NL	NL	NL
With Unlimited Height	AISC 360	3.0	1	NL	NL	NP	NP	NP

A- Concentric Brace



- Concentrically braced frame are those in which the centerlines of members that meet at a joint intersect at a same work point to form a vertical truss system that resist lateral forces.

Member and Connection Forces assuming no gravity loads, short periods and SDS = 1.0

System	Detailing	R	Ω_O	Member/Fdn Force (1/R)	Connection Force (Ω_O/R)
Steel OCBFs	AISC 341	3.25	2	(1/3.25) = 0.31	(2/3.25) = 0.62
With Permitted Height in SDC D, E and F	AISC 341	2.5	2	(1/2.5) = 0.4	(2/2.5) = 0.80
With Unlimited Height in SDC A, B and C	AISC 360	1.5	1	(1/1.5) = 0.67	(1/1.5) = 0.67
With Unlimited Height in SDC A, B and C	AISC 360	3.0	1	(1/3.0) = 0.33	(1/3.0) = 0.33

The Problem and Suggested Solution

- For larger industrial structures (higher than 35 feet), some cost-conscious nonbuilding structure design engineers are using the not detailed OCBFs with R = 1.5 and higher member and foundation forces rather than using a seismic detailed OCBFs per AISC 341 with R = 2.5 because the connection forces are lower (e.g. 67 bolts rather than 80 bolts per connection). **This was not intended.**
- There is no real basis for the omega zero value of 2 to be used with an R = 2.5. I just kept the same as the omega zero value to be used with R = 3.25 back when was this option was proposed for inclusion the 2003 NEHRP.
- My suggested solution is to reduce the value of omega zero to be used an R = 2.5 to value of 1.7 or less (perhaps as low as 1.5) so there will be no direct incentive to use the not detailed for seismic option.
- Rafael Sabelli suggested that the PUC steel working group + representatives of the nonbuilding structure issue team study the issue and come back with a formal proposal to the PUC.

Somethings to Consider when Developing a Solution

- No one is going to do a P-695 study or pushover analysis to justify because no-one can provide the general archetypes to considered for ordinary and not detail for seismic systems. They can provide archetypes for a very small subset of these systems. **Furthermore no-one would pay for such studies. This proposal will require the PUC to exercise their judgment as we did many years ago.**
- Another option would to reduce the R value for a steel not detailed for seismic system to something like 1.2 or less. But there really is no justification for this. Heavy industrial steel nonbuilding structures are very rugged and their connections typically provide a good moment frame back up system. **Another problem with reducing the R value for these systems would be it makes them suddenly no longer OK with no justification.**
- Remember, 40 years ago steel not detailed for seismic systems utilized a K = 2 (Rw = 4) for industrial structures and folks like Henry D. were quite comfortable with that in high seismic areas. Today that would be a R = 2.7.