

seated connections with web clip (SWC) were evaluated for horizontal and vertical failure loads, but the web clip and the seat capacities were evaluated separately.

The ratio of vertical failure load (no load or resistance factors) to the design load was determined for fin, header, and knife connections, as shown in Table 11–2, Table 11–3, and Table 11–4. The average vertical failure load-to-design load ratio was approximately 3.2 for the core floor beams and girders and 4.4 for the tenant floor beams and girders; the values ranged from a minimum of 1.9 to a maximum of 7.2. A vertical failure load to design load ratio of approximately 2.0 to 4.0 is within the typical range expected for these types of connections.

Failure loads for forces applied in the horizontal direction depended on the direction of load. For instance, if a knife connection was subject to a compressive axial load, the failure mode would be bolt shear, but if it were subject to a tensile load, the failure mode would be fracture of the weld at the column face. Since the shear connections were not designed for a horizontal load, no comparison of horizontal load capacity to design load could be made.

Table 11–2. Ratio of vertical capacity to design shear load of shear connections for floor beams and girders on a typical tenant floor.

Tenant Floor Beams and Girders	Connection Type	Failure Load (kip)	Failure Mode	Design Shear Load (kip)	Failure Load/ Design Shear Load
Floors 8 to 20, 24 to 45					
South Tenant Floor					
W24x62	H4	217	Block Shear-plate	69	3.1
W24x62	K4	190	Block Shear-web	69	2.7
W16x77	F4	166	Block Shear-plate	73.4	2.3
W16x26	F4	123	Block Shear-web	23	5.3
W16x31	F4	135	Block Shear-web	28	4.8
W18x40	F5	185	Block Shear-web	41	4.5
East Tenant Floor					
W21x44	F6	229	Block Shear-plate	40	5.7
W24x55	F6	229	Block Shear-plate	46	4.9
North Tenant Floor					
W12x26	F3	91	Block Shear-web	15	6.0
W12x26	H2	100	Weld	15	6.7
W21x44	F5	200	Block Shear-plate	41	4.9
W24x55	F6	229	Block Shear-plate	48	4.7
W24x55	F7	309	Block Shear-web	48	6.4
W30x116	H5	267	Block Shear-plate	109	2.5
W16x31	F4	135	Block Shear-web	26	5.1
W24x76	H4	223	Block Shear-plate	73	3.0