

How to read The Simpson Strong-Tie Catalog

The Simpson Strong-Tie Catalog describes the different types of hardware made by Simpson Strong Tie, the largest construction hardware manufacturer in the United States. Simpson manufactures practically all of the hardware used in wood frame construction for both new and retrofit projects. It is therefore very important to be able to accurately read this catalog. The tables within the catalog provide the earthquake resistance capacities, also known as "lateral load capacities", of connectors as well as the size and length of fasteners that are to be used in each piece of hardware.

For example, on page 136 of the C-2004 catalog, the "Fasteners" column specifies that the H10 hurricane tie should be installed with 8-8d x 1 1/2 fasteners. This means that the connector should be installed with eight 8d common nails (also known as 8-penny nails) that are 1 1/2 inches long. Further, in the "DF/SP Allowable Loads" (DF stands for Douglas Fir and SP stands for Southern Pine) section under the "Lateral F1" column it reads 585. This means that the hardware will resist 585 pounds of lateral force parallel to the wall (resulting from either wind or earthquake) if it is installed as specified in the catalog.

Some connectors, mainly straight straps and face mount hangers, can be installed with certain nails other than the ones listed in the catalog and still be rated for load capacity. On page 14 of the Simpson C-2004 Catalog the table titled "Load adjustment factors for optional nails used with face mount hangers and straight straps" gives load adjustment factors when nails are used other than those specified. The load adjustment factor is the number found all the way to the right of the table. This number is multiplied by the allowable load value listed in the catalog for a particular connector to determine the "adjusted" load value. For example: On page 131 of the C-2004 catalog, the LSTA9 strap tie installed per the catalog with eight 10d common nails is rated for 645lbs under the "(133)" column. The load capacity of the same strap is reduced to 497lbs when installed with shorter 10dx1 1/2" nails ($645\text{lb} \times 0.77 = 497\text{lbs}$). For substitutions other than the ones stipulated in the load adjustment table (e.g. going from 10dx1 1/2" nails to 8dx1 1/2" nails), the user needs to contact a competent structural engineer familiar with wood frame retrofit principles.

It is important for the user to understand why the lateral F1 columns labeled (133) or (160) are the ones consulted in seismic retrofit work. Building codes allow for an increase in the load carrying capacity of wood or wood connections when loaded for a short period of time; the shorter the duration, the greater increase. Actual tests have shown that wood frame connections withstand from 33% to 60% more force if loaded for a short period of time similar to earthquake loading. This is a property unique to wood and it is reflected by how Simpson rates its connectors. Another example can be seen on page 143 of the C-2004 Simpson Catalog. The Simpson L70 Angle is often used in retrofit work. As a floor connector that must only resist gravity it is assigned a value of 445 pounds. Under the 133/160 column that is reserved for seismic and hurricanes, it has a value of 565 pounds. This is a big difference, which is why it is important for the user to make sure he is looking at the proper column when doing retrofit design work. The two sections with (133) and (160) reflect the fact that some jurisdictions allow for a 33% increase while others permit 60%. This is because actual tests have shown that wood frame connections withstand from 33% to 60% more force if made to resist forces similar to the force generated by earthquakes. The Bay Area currently uses the 33% increase.

The information found in the Simpson Strong-tie Catalog is essential to anyone involved with wood frame seismic retrofit work because 99% of the hardware used can be found here. If there are any questions about the connectors in the catalog, users are encouraged to contact Simpson Strong-Tie at (800) 999-5099 for technical assistance.