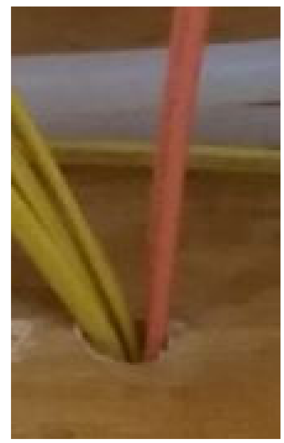
U.S. Technical Note GE-27

Electrical Wiring Installation in Horizontal Holes

At times electrical contractors will cut a series of small holes in Boise Cascade BCI® / AJS® wood I-joists, Versa-Lam® LVL, and BOISE GLULAM® products and install only one electrical wire per hole, rather than combining multiple wires within single holes. In most cases, more than one electrical wire can be placed through an individual hole.

Placement of multiple wires through single holes depends upon both installation and wire type. The NEC (National Electrical Code – Article 310) and International Building Codes (IRC - Section E3705 and IBC) require ampacities derating of electrical wires when more than three current-carrying conductors are bundled in a raceway or cable, or where single or multi-conductor cables are stacked/bundled together for bundled lengths greater than 24". For reference, typical residential 12-2 NM cable wire has two current carrying conductors and 14-3 NM cable wire has three current carrying conductors.

Photographs shown at right depict typical residential wiring conditions. These wires are not physically tied together, thus are not defined as bundled and would not require derating. Bundled wires are defined as cables or conductors which are physically tied, wrapped, taped, or otherwise periodically tied together for more than 24". Four to five 14-2 NM cable wires can fit comfortably in a 1-1/2" diameter hole and would not require derating as long as they are not physically tied together where installed through an I-Joist web or Versa-Lam® LVL / BOISE GLULAM® beam hole.



If ambient temperature is greater than 86°F, there is an additional derating factor. For typical interior temperatures in the 70°F range, a plus 4 percent advantage (no derating) is allowed. (Ambient = temperature of surrounding air)

Derating is mainly for wires enclosed where loss of heat must occur thru the container containing the wires. The derating of amps is due to heat build-up; thus, the allowable amps are reduced in the derating, dependent upon wire size, bundling method, and type of container.

An I-joist web or beam hole condition, when located correctly, is very minor compared to typical conditions located at the electrical breaker box. Please note that the electrical contractor and/or project Electrical Engineer of Record are responsible for the design and installation of all electrical components to comply with applicable building code.

Please refer to Boise Cascade Specifier or Installation Guides for proper hole location. For multiple holes, the amount of uncut wood measured horizontally between holes must equal at least twice the diameter (or longest side) of the largest hole. Stacking holes vertically requires further engineering analysis.