Boise Cascade
Engineered Wood Products
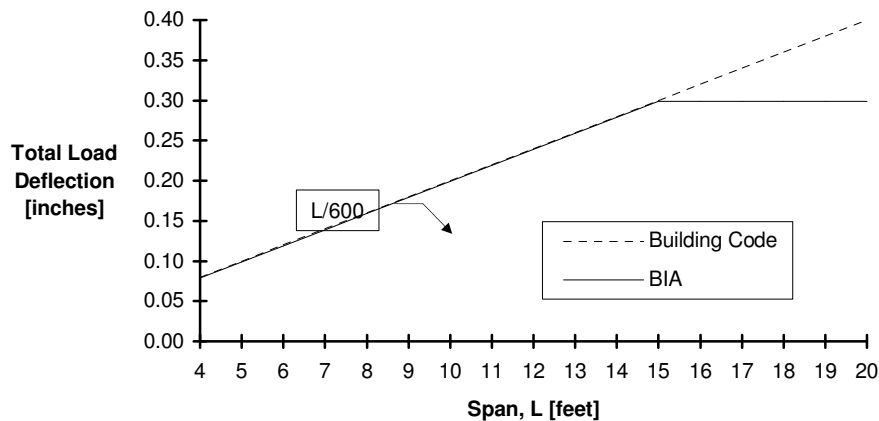
Brick Veneer Support on Wood

Brick veneer is normally supported across openings by lintels made from structural steel angles. Sometimes the combination of veneer weight and opening size is enough to require an angle that is too large to be practical. In these cases, alternatives to consider include steel T or I-beams, a reinforced brick masonry beam or a wood beam. Wood beams are an option only if permitted by the local building code.

The International Residential Code (2006 IRC, 703.7) allows the use of wood members to support exterior walls with brick veneer provided the veneer weighs no more than 40 pounds per square foot, the deflection of the wood member is limited to 1/600th of the span under total load, and construction is in Seismic Design Category A, B or C (contact local building official for the seismic category). Standard 4 inch thick clay brick veneer weighs 39 pounds per square foot. Questions about local code restrictions should be directed to the local building department.

Two common conditions where a wood beam might be considered for brick veneer support are at a garage door, or above a one-story projection on a two-story building. Each of these conditions are addressed in publications by the Brick Institute of America (BIA)[1]. In the case of the one-story projection, the brick veneer is either supported by multiple rafters, or it rests on an angle that is connected to a stud wall. A wood beam might be used to carry the stud wall across an opening.

The BIA recommends a slightly more restrictive total load deflection limit than that required by the building codes. The recommendation is the same 1/600th of the span under total load for spans up to 15 feet, but for longer spans the BIA recommends holding total load deflection to 0.3 inches.

Recommended Deflection Limits

The BIA publications describe how building dimensions and the placement of expansion joints may affect the brick load on the beam. The worst case condition is where the full weight of the brick veneer above the opening must be supported by the beam. Determination of the effects of building geometry and expansion joints are beyond the scope of an EWP Technician's responsibility, so standard procedure when sizing a beam should be to consider the full weight of the bricks above the opening unless another load has been specified by the building designer.

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[1] *Support of Exterior Brick Veneer on Wood*, BIA Engineering and Research Digest, February 1995
Brick Masonry Over Garage Openings, BIA Engineering and Research Digest, Undated

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The beam may also support roof or floor framing in addition to the weight of the brick veneer. These loads must be included when comparing total load deflection to the recommended limit.

EXAMPLE:
Determine the brick veneer load on the beam in Figure 1 that spans the 10 foot opening where the one-story wing intersects the two-story brick house. (Both roofs are hipped and finished with shingles.)
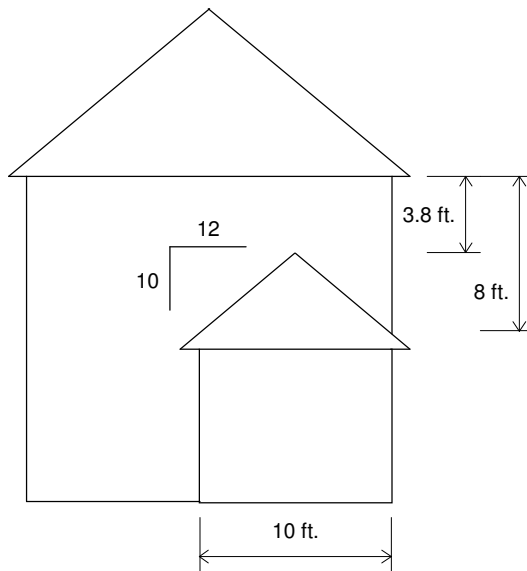
The brick veneer load at each end of the beam is:
$39 \text{ lbs/ft}^2 \times 8\text{ft} = 312 \text{ lbs/ft}$

The brick veneer load decreases at a uniform rate toward the middle of the beam to a minimum value of:
$39 \text{ lbs/ft}^2 \times 3.8 \text{ ft} = 148 \text{ lbs/ft}$

The weight of the stud wall behind the brick veneer must also be considered when sizing the beam. Assume this wall weighs 60 lbs/ft, the same as an 8 foot high interior wall.

Figure 1

Figure 2 shows how the brick veneer and wall loads are input when using the BC Calc® program to size the beam. Roof and floor loads must also be input if they are to be supported by the beam.
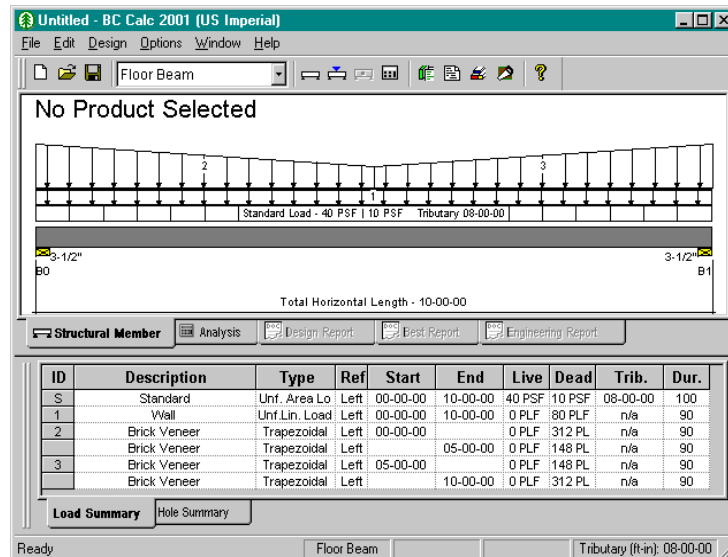
ID	Description	Type	Ref	Start	End	Live	Dead	Trib.	Dur.
S	Standard	Unf. Area Lo	Left	00-00-00	10-00-00	40 PSF	10 PSF	08-00-00	100
1	Wall	Unf.Lin. Load	Left	00-00-00	10-00-00	0 PLF	80 PLF	n/a	90
2	Brick Veneer	Trapezoidal	Left	00-00-00		0 PLF	312 PL	n/a	90
	Brick Veneer	Trapezoidal	Left		05-00-00	0 PLF	148 PL	n/a	90
3	Brick Veneer	Trapezoidal	Left	05-00-00		0 PLF	148 PL	n/a	90
	Brick Veneer	Trapezoidal	Left		10-00-00	0 PLF	312 PL	n/a	90

Figure 2