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June 1, 2015

Milton Odom
Ft. Knox Safe Rooms
38 E. 44th Street
Tulsa, OK 74105

Re: Structural Review of Proposed
Above Ground Steel Storm Shelters
Of Various Sizes

Dear Mr. Odom:

I have completed a structural review of the referenced storm shelters based on dimensional information furnished. The review was based on the design requirements of FEMA 320 (Third Edition), FEMA 361 (2nd Edition), ICC-500 and ASCE 7-05.

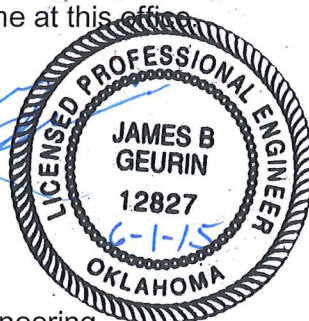
The shelter varies in plan dimension from 3 ft. x 3 ft. to 5 ft. x 7 ft. (the sizes are attached) and is 6'-10" tall. It has a 3'-0" x 6'-8" or a 2'-0" x 6'-8" door opening. The construction is all steel. The framing is 3/16" bent plate panels, 12" wide with a 2" flange on all four sides of the panel. Panels are bolted together with 1/2" bolts at 6" centers. The corners of each unit are formed in a large bevel (45 deg. angle) and are 7" or 14" across and are bolted at the 2" flange at each end to the standard wall panels. The single out-swinging door is made from a solid sheet of 3/16" steel and is bent at 45 deg. at each edge to overlap the wall panel. The double in-swinging doors are made from the typical 12" wall panels. The door hinge is a continuous heavy duty hinge with 3/8" pin and 2" knuckles. The roof panels are similar to the wall panels except they have an additional 2" continuous stiffener along the flange edge for additional strength. The shelter has no floor and is intended to be bolted to a concrete slab (4" minimum thickness) w/ 1/2" Simpson Strong-tie Titan HD Anchors, set 3 1/2" into the concrete slab. Minimum anchor patterns are 12" centers on side walls and 2 anchors at all four beveled corners. The anchors must be installed in accordance with the manufacturer's recommendations.

I have reviewed the shelter design using a wind speed of 250 MPH, which is the maximum wind speed to be used in safe room design for an EF5 tornado.

Based on my calculations, which are attached (16 pages total), all the proposed shelter sizes will perform within allowable stresses of the steel materials. No deficiencies were found in the shelter design and when properly constructed it should survive the wind pressure forces of an EF5 tornado intact as dictated by the previously stated references.

I thank you for this opportunity to provide this review. If you have any questions or concerns, don't hesitate to contact me at this office.

Sincerely,



James B. Geurin, P.E.
Director of Structural Engineering
C. of A. #5305 (exp. 6-30-15)
(Ft Knox Safe Rooms Review.doc)