



---

**STRUCTURAL ENGINEERS, P.C.**

4525 Trousdale Drive  
Nashville, Tennessee 37204  
(615) 781-8199 ■ Fax (615) 781-4088  
www.emcnashville.com

September 25, 2012

Mr. Alan Dopp  
586 Natchez Bend Road  
Nashville, Tennessee 37064

**RE: Dopp Residence  
EMC Project No. 10903**

Dear Mr. Dopp:

At your request, we are writing to summarize our structural involvement in the construction of your residence located at 586 Natchez Bend Road. EMC Structural Engineers, P.C. has continually been involved in the design and inspection of this residence since 2009. The design philosophy used during the construction process typically exceeded the minimum design requirements of the building code. The following is a summary of structural items that we believe were beyond minimum code requirements implemented throughout the construction of the residence.

- EMC Structural Engineers, P.C. was involved throughout the design and construction process.
- EMC Structural Engineers, P.C. performed framing inspections and reinforcing inspections of the foundation prior to construction (photograph 1).
- A concrete testing company was involved in the testing of the foundations and the testing of the concrete used in construction of the foundation, the slab-on-grade, and the basement walls.
- Simpson hold-downs were used at all corners of the residence to provide increased seismic resistance (photograph 10).
- The exterior plywood sheathing was attached at a reduced spacing in order to increase the lateral shear resistance of the exterior walls.
- Seismic strapping was added to the mechanical and plumbing system to provide lateral restraint during a seismic event (photographs 7 and 8).
- EMC Structural Engineers, P.C. was involved in the design of the attachment of the speakers shown in photographs 2 and 3. These speakers are mechanically connected to the plywood shear walls to prevent toppling of the speakers during a lateral seismic event.

### **Seismic Resistance**

The items listed above are typically not structurally required or are they used in typical residential-type construction. We used this type of design philosophy in order to increase the seismic resistance of the structure beyond the required code minimum. We believe that the structure can effectively resist the design earthquake for Middle Tennessee and would only sustain minor structural damage during a major earthquake event.

### **Wind Resistance**

In addition to the lateral seismic resistance, Simpson hurricane ties were used at all significant load points for the roof structure to hold down the wind uplift forces. Similar to the design philosophy for the seismic resistance of the structure, these hold-downs were designed well beyond the calculated values per the building code. The unique geometry for the areas of the residence at the corners were vertically restrained by vertical steel tubing that provides vertical support for uplift and gravity of the roof structure (photograph 9). Again, the roof structure is anchored to the shear walls of the residence well beyond the minimum code values.

### **Wine Racking Structure**

EMC was deeply involved in the design and construction of the Wine Racking Structure (photograph 3). We routinely made site visits during and after construction to monitor the construction of these frames and to evaluate the installation. The design philosophy that was implemented for the main portion of the residence was applied to the Wine Racking Structure. We evaluated the Wine Racking Structure to resist the design for earthquakes for Middle Tennessee and added lateral strapping to the back of each of the racks to provide ductility for racking during an earthquake event. In addition, Quake Guard Rings® were added to each bottle to prevent the bottles falling out of the racks when exposed to a seismic event (photographs 5 and 6). In our professional opinion, the Wine Racking Structure would only sustain minimum damage during a major seismic event.

### **Summary**

In summary, it is important to understand the design philosophy used during the construction of the house. Mr. Dopp insisted that a robust lateral-resisting design be used for each of the structural and non-structural elements in the building. This design philosophy resulted in the

Mr. Alan Dopp  
EMC Project No. 10903  
September 25, 2012  
Page 3

construction of a house that is more resistant to a seismic and wind event than typical code-required construction.

Please call if you have any questions or require further assistant.

Sincerely,

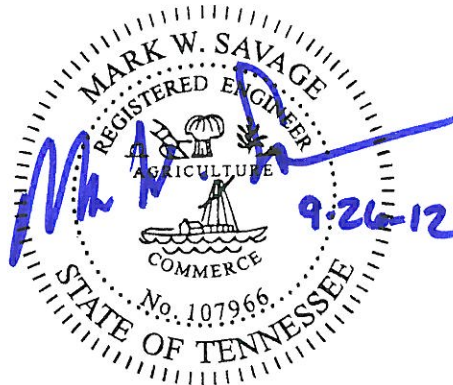
**EMC Structural Engineers, P.C.**



Mark W. Savage, P.E.  
Principal

MWS/pjs

Attachments





**Photograph 1: Reinforcing for the concrete basement walls.**

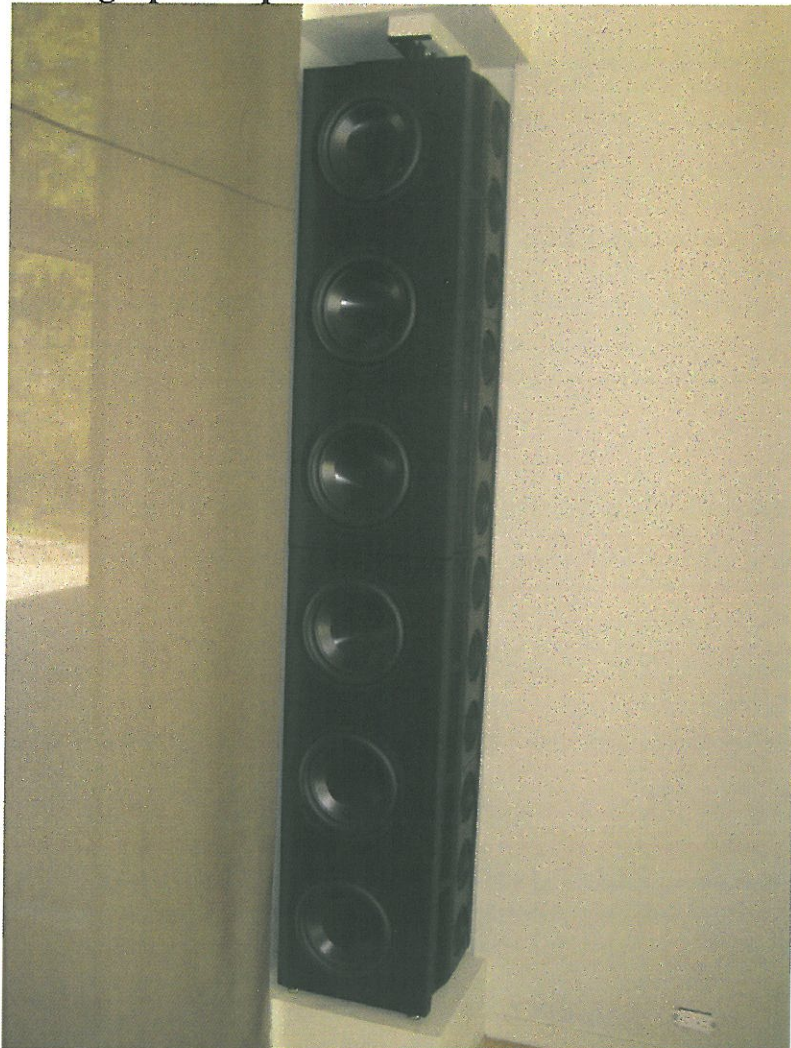
**Photograph 2: Speaker connection.**

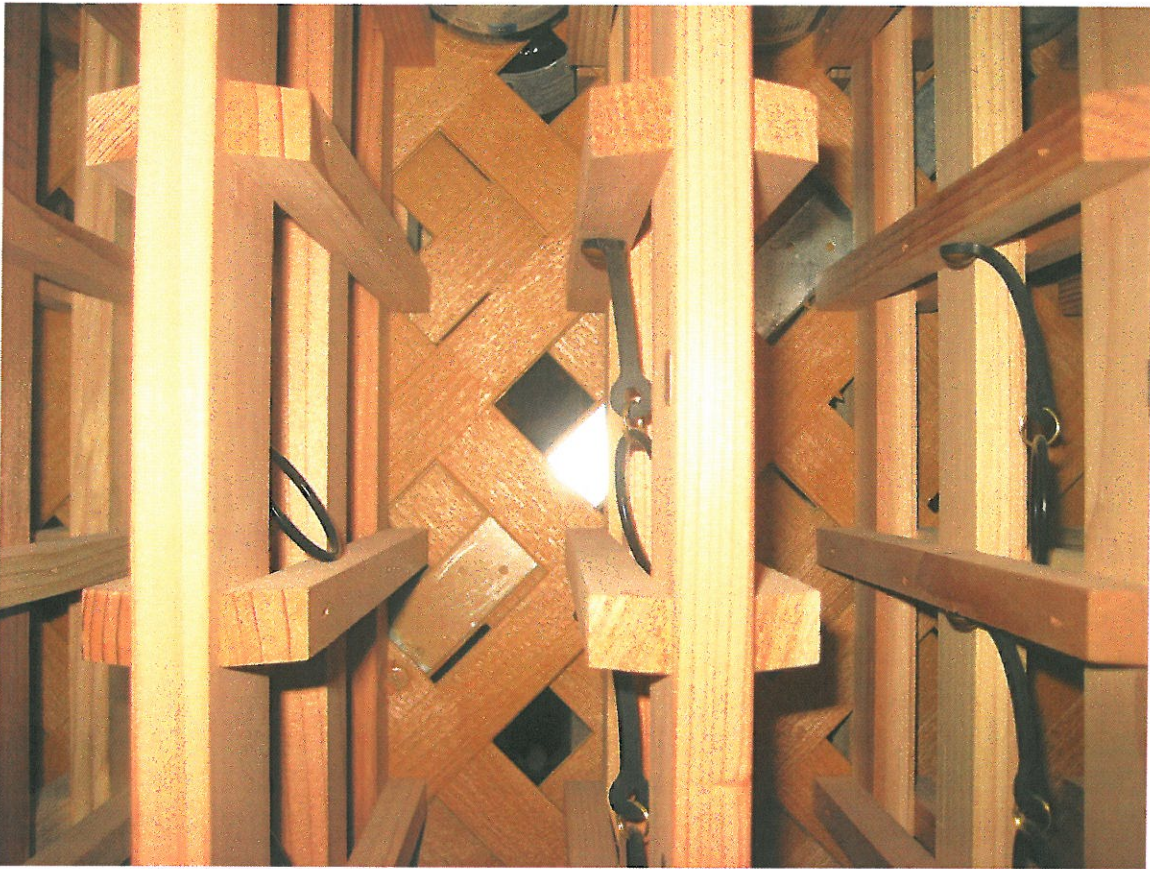




**Photograph 3: Wine rack strapping.**

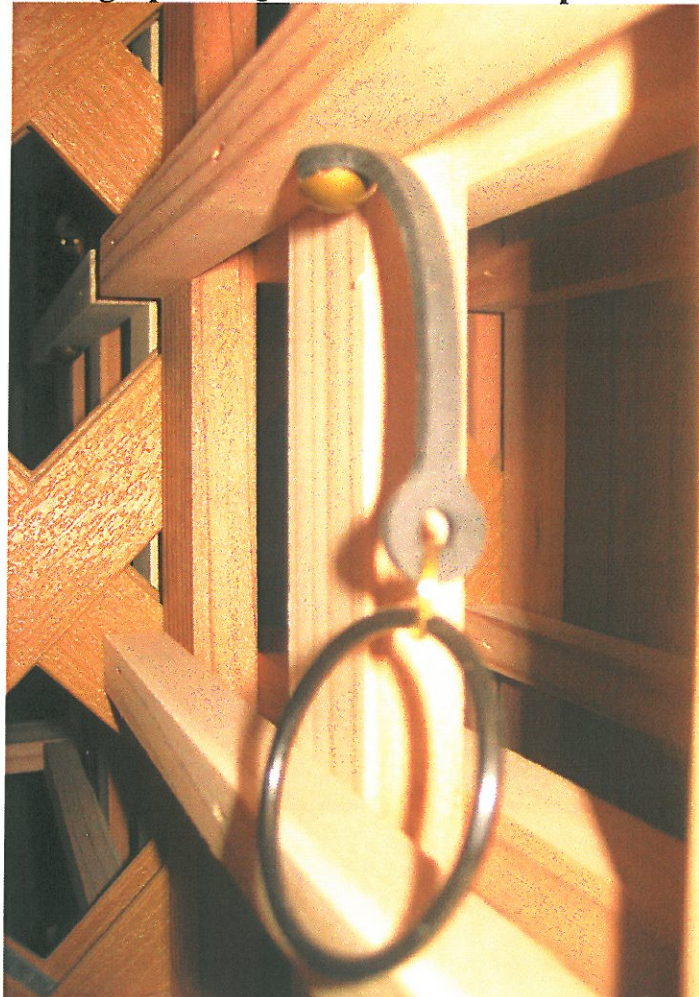
**Photograph 4: Speaker.**





**Photograph 5: Quake Guardian strap.**

**Photograph 6: Quake Guardian strap.**





**Photograph 7: Tank strapping.**

**Photograph 8: Water heater strapping.**





**Photograph 9: Roof tube framing.**

**Photograph 10: Simpson holddowns.**





**Photograph 11: Simpson ties.**

**Photograph 12: Simpson ties.**

