SPUTO AND LAMMERT ENGINEERING, LLC
STRUCTURAL ENGINEERS
1731 NW 6th STREET, SUITE D, GAINESVILLE, FL 32609
PHONE: 352-378-0448 FAX: 352-373-1331
E-MAIL: salestructures@gmail.com

26 October 2021

City of Gainesville – Facilities Management
P.O. Box 490
Station 51
Gainesville FL 32627-0490

Re: Thelma Boltin Center, 516 NE 2 Ave, Gainesville, FL - Partial Roof Collapse

As requested, the undersigned performed limited site observations to evaluate a partial roof collapse at the auditorium of the Thelma Boltin Center. The first observation visit was on 08 January 2021 to make a preliminary safety evaluation. The second observation visit was conducted on 01 April 2021 with the failed truss supported by shoring. The third visit on 26 April 2021 was to observe the other roof trusses for potential damage

The approximate date of construction is 1940. The roof system consists of heavy timber trusses which are spaced at approximately 12 foot on center, and which span approximately 49 feet. The trusses support wood purlins and a roof deck consisting of closely spaced individual wood boards. The trusses are supported on a concrete masonry wall with pilasters at the truss bearing locations. The walls are assumed to be unreinforced based upon the date of construction. The trusses bear on the masonry and are attached to the masonry using a pair of angles with small anchor bolts to the masonry.

Site Observation Visit 1 – 08 January 2021

During the initial observation visit on 08 January, it was apparent that the roof over the auditorium stage had sagged approximately 8 to 12 inches. Accessing the above-ceiling space showed that the truss over the stage had suffered a catastrophic failure at the west end. The last two truss panels had failed and had wedged themselves into a temporarily stable condition by pressing against themselves and the exterior wall. I recommended that the truss be properly shored to prevent a sudden complete collapse.

Due to the limited access and safety concerns, I was unable to definitively determine where the failure began, however from previous experience with similar damaged trusses and from the literature, the failure may have originated where a longitudinal crack intersected a bolt at a connection.

Trusses of this type which pre-date approximately 1960 are prone to failures of the tension members due to the following reasons:

1. Allowable tension stresses for timber were unconservatively high, ranging from 50 to 100% higher than currently permitted.
2. Drying shrinkage in a hot attic environment causing longitudinal checking (cracking) in the wood, particularly where the wood is restrained by multiple fasteners.
3. Brashing of the wood (failure perpendicular to the grain) due to prolonged heat exposure.

Site Observation Visit 2 – 01 April 2021

During the second observation visit on 01 April, the failed truss was shored, and the attic space better opened to view the truss, although the non-structural wood wrapping on the bottom chord had not been removed. This prevented a good view of the bottom (tension) chord of the truss.

I was then able to confirm that the failure was confined to the last two westmost panels of the truss. Because of the lack of access to the bottom chord, I was not able to definitively say that there are no defects in that chord. It was recommended that additional openings be made in the ceiling for additional observation of the other roof trusses.

Site Observation Visit 3 – 26 April 2021

This visit on 26 April was to observe the other roof trusses for potential damage. Prior to this visit, several openings through the suspended acoustical ceiling were created. Limited areas of the original fiberboard ceiling and trim boards covering the trusses were removed.

In every area viewed, evidence of wood destroying organism (WDO) activity was present in the form of fine black pellets. I believe these to be signs of drywood termites, but this would need to be confirmed by a licensed entomologist. For purposes of readability, this report will refer to these WDO's as "termites." During this limited observation, I did not see a live termite infestation, however I cannot rule out current activity.

The truss closest to the south wall was repaired at some point in the past. Most likely this repair was performed prior to a collapse of the truss. The bottom chord and some over the truss webs were replaced at the east end, and a new steel bracket was attached to the masonry wall to support the east end of the truss. Termite damage to the wood, to both the original and replacement material, was readily seen.

Each of the other trusses over the auditorium and associated framing also showed signs of damage by termites. I cannot rule out that the failure of the truss over the stage was in at least part due to termite damage.

Since there were fairly large amounts of the black pellets on the acoustical ceiling and in the wood trim (both items added during the 1990's renovation) I can surmise that there was an infestation since that renovation, which may or may not be currently active.

Very limited observations in the other wing of the building which contains the kitchen and sitting area did not show damage or WDO infestation at this time.

Recommendations for Further Action

Failures such as what occurred to this truss are a known problem with trusses of this vintage. Generally, cracks and other distress is visually apparent before a catastrophic failure such as this truss has occurred. This problem has been exacerbated by the presence of damage by WDO's.

Given that the city was planning on renovations to the structure prior to the collapse, there are several options that could be considered by the renovation project team for further exploration.

It may be possible to make repairs to the existing truss roof structure and to retain the masonry walls. If that is a route that the project team wishes to explore, I would strongly recommend that all the trusses be opened up for a complete visual inspection.

Alternately, either by choice, or because of the extent of damage, it may be necessary to remove and replace the entire roof structure. If this option is considered, the condition and details of the existing unreinforced masonry walls would have to be considered. Inserting any new structure, such as a steel frame, within the existing walls would be limited by the foundations of the existing walls.

Upon consideration of all the options, complete demolition and replacement of either the auditorium wing, or the entire facility may be the most cost effective path to pursue.

Sincerely,

SPUTO AND LAMMERT ENGINEERING, LLC

THOMAS SPUTO

Digitally signed by THOMAS SPUTO
Date: 2021.10.26 23:43:44 -04'00'

Thomas Sputo, Ph.D., P.E.
Florida PE 39142

This item has been electronically signed and sealed by Thomas Sputo, P.E. (FL PE 39142) on 26 October 2021. Printed copies of this document are not considered signed and sealed. This digital signature must be verified on any electronic copies. Sputo and Lammert Engineering, LLC, 1731 NW 6th St, Suite D, Gainesville FL 32609 (FL CA 6855)

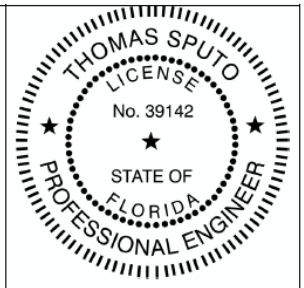

Figure 1. West end of truss

Figure 2. West end of truss

Figure 3. Exterior masonry wall with crack

Figure 4. Interior wall damage

Figure 5. Termite damage to ceiling joist

Figure 6. Retrofit seat and repaired (spliced) truss chord at south truss

Figure 7. South truss. Failed web member with exposed bolt not engaging replacement web

Figure 8. South truss. Note visible termite damage to both old and replacement wood. When the screwdriver was inserted between the plies, black pellets dropped, indicating the probability of termite activity and damage between the wood plies.

Figure 9. Example of black pellets from suspected termites on suspended ceiling added during 1990's renovation.

Figure 10. Example of black pellets from suspected termites on trim boards added during 1990's renovation.

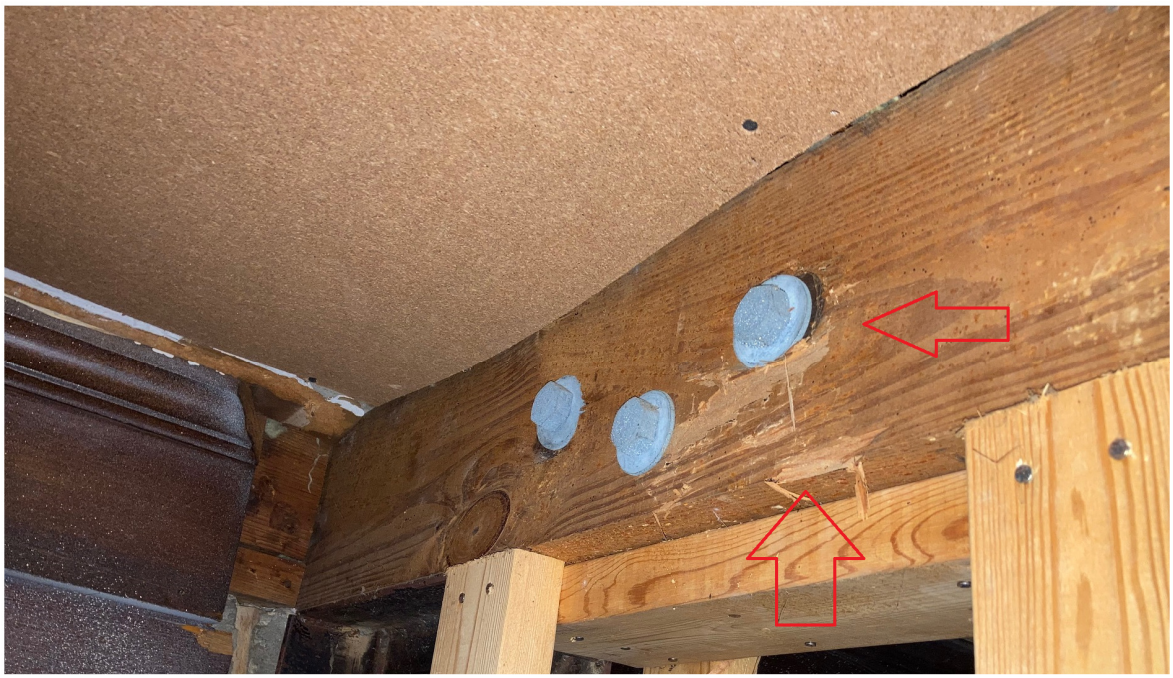

Figure 11. Termite damage to truss chord, including under bolt heads

Figure 12. Termite damage extending into connection

Figure 13. Termite damage along truss chord