

Thornton Tomasetti

Via email:

October 9, 2008

Tina Koonce
Director of Facilities
HEMET UNIFIED SCHOOL DISTRICT
1791 West Acacia Avenue
Hemet, California, 92545

RE: FLOOR AND FOUNDATION SETTLEMENT INVESTIGATION
HEMET ELEMENTARY SCHOOL
833 E. KIMBALL AVENUE
HEMET, CALIFORNIA
TT Project No. GG5589

Scope of Services

The objective of this study is to evaluate the floor settlement at the East side of the main classroom building and develop recommendations for mitigation.

Introduction/ Background

The Main classroom building was built in the late 1920's and a retrofit was done in the late 1940's.

The primary structural framing system consists of diagonal roof sheathing over wood trusses spanning over the classroom walls. Exterior and interior bearing walls are supported on concrete stem walls. Floor joists span between exterior concrete stem walls and girders which are supported by interior concrete piers. It seems that the building's lateral force resisting system consists of cantilevered concrete columns which are supported on the concrete piers and grade beams. During the 1940's upgrade, additional concrete pad footings, floor joists reinforcing and structural drag struts on the roof were added.

Thornton Tomasetti performed the first site observation on July 20, 2005 to inspect the diagonal cracks on the interior classroom walls. The inspection was limited to visual observations of the accessible area and no physical probes or testing of materials was performed.

The cracks observed during the 2005 inspection were mostly concentrated at the top corner of the south wall of room 21. The cracks extend diagonally ranging from hairline to 1/4" width.

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Some interior wall cracks also were observed in the class room near room 21. Several hairline cracks were also observed on the exterior of the building.

The walls showing crack / distress are non-bearing walls between classrooms. At the time of the 2005 inspection, we concluded that the building distress is minimal and not structurally significant. Our recommendation was to repair the interior as well as the exterior plaster wall cracks and no immediate structural safety concerns were indicated.

In May of 2008, our office was contacted for an additional inspection. We were informed that more cracks were observed since our last visit in 2005. Our observation confirms that more cracks on the interior walls and exterior walls developed. In addition, settlement of the floor along the east side of the building was very noticeable and Thornton Tomasetti recommended to have a geotechnical engineer investigate for the soil settlement. Inland Foundation Engineering, Inc was hired to inspect the foundation settlement.

While Inland Foundation Engineers were conducting the subsoil investigation of the site, the School maintenance crew noticed the cracks were getting worse, so Thornton Tomasetti made an additional visit to the site on August 14, 2008. During the site visit, our engineer inspected the crawl space under the floor joists.

Findings

The floor and foundation system for this building is a so called "raised floor system". Floor joists sit on the short wood stud stem wall, which rests on the pressure treated sill plate. Sill plates are fastened to the concrete foundation with anchor bolts. However there are a 1/2" to 1" gap between the bottom of the sill plate and the top of the concrete footing. The gap was supported by small wood shim plates which are spaced approximately 16' to 24" on center. It is our understanding that the gap should have been filled with non-shrink grout after the super-structure frame works done.

Conclusions and Recommendations

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Based on soil engineers report, the settlement is due to the effects of localized saturation of the subsoil in the area of the settlement along the east wall of the structure (Inland Foundation report dated Sep. 5, 2008) Our recent observation concur with the Geotechnical engineer. The mitigation method proposed by the Inland Foundation is acceptable from the structural engineer's point of view.

In addition, the soils engineer recommends that the structure be reviewed by the Structural Engineer in order to determine if the current distortion has affected the structural integrity. It is our opinion that the settlement did not substantially affect the structural integrity. However, the as-built raised floor stem wall needs to be retrofitted.

The raised floor construction was commonly used until 1960's. However, the raised floor systems have been found to be very vulnerable to seismic lateral force during recent earthquakes. Typically, raised floor systems lack the shear force carrying capacity. In addition, the gap between the sill plate and concrete foundation would not provide the friction.

It is our opinion that the building requires seismic retrofit as soon as possible. The lack of shear load carrying capacity can cause significant damage to the building during mild magnitude seismic activity. The following are our recommendations;

Immediate structural condition survey / assessment of the safety of the school structure

- Inspect entire building to determine if the foundation settlement has affected the structural integrity.
- Coordinate with Geotechnical Engineers to determine if a geotechnical mitigation plan (pressure grout) precedes structural mitigation.

Immediate structural retrofit includes

- Re-level the floor joists by jacking, re-frame the stud stem wall.
- Add plywood shear panels on the raised floor stem wall
- Fill the gap between sill plate and concrete footing with non-shrink grout
- Add more anchor bolts as needed.

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Long term retrofit

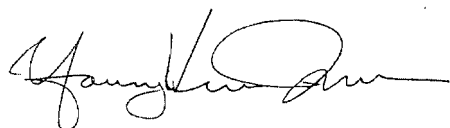
This building is in need of major structural upgrade

- Re-analyze entire building to upgrade the building to current code
- Re-evaluate the soil/Foundation condition to determine if soil improvement is recommended for the entire building as well as all other buildings on the Campus.

We appreciate the opportunity to be of your service and should you have any question or suggestion, please don't hesitate to contact us.

Very truly yours,

THORNTON TOMASETTI, INC.



Young Nam, SE
Vice President