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PFK Developments Inc
25007 Mountainview Tr
Calgary, Alberta
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Attention: Mr. Marc Peers:

Re: Structural Report on Titan Wall Basement Panel System

Job No.: 6157

The Titan wall basement panel is a structurally insulated panel similar to conventional OSB SIPS panels with Titanboard sheeting in lieu of OSB. The structural aspects of the panel are the subject of this report.

As requested, Heninger Structural Engineering has been asked to review the structural integrity of the Titan wall system in regards to its use as residential basement wall panels. Our review has been based on the following:

- Structural Loads as outlined in 1997 Alberta Building Code and 2005 National Building Code of Canada and as described in detail in the body of this report.
- Test results provided by Intertek Testing as described in April 2006 report titled "Structural Testing of Structurally Insulated Central (Magboard and EPS) to ASTM E72-02 'Standard Test Methods of Conducting Strength Tests of Panels for Building Construction'" produced by Intertek.
- Test results performed by PFK Developments in November of 2006. Said results included combined axial and lateral load testing only.
- Fabrication in accordance with strict adherence with Titan wall standards.
- Installation in strict accordance to Titan wall procedures and connection details.

Loading Assumptions

Analysis performed and used to develop results of this report assume lateral pressures based on parameters outlined in Section 9.4 of the 1997 Alberta Building Code which discusses structural requirements for housing and small buildings. These loadings match requirements of 2005 National Building Code of Canada. Clause 9.4.4.6 reads:

- 1) Walls supporting drained earth may be designed for pressure equivalent to that exerted by a fluid with a density of not less than 480 kg/m³ and having a depth equal to that of the retained earth.
- 2) Any surcharge shall be in addition to the equivalent fluid pressure specified in sentence (1).

Earth pressures used in this report are based on sentence (1) above and heights of backfill noted in the report. Analysis further assume surcharge at top of grade equal to 100 pounds per square foot accompanied by an associated active pressure coefficient equal to 0.4.

Lateral loads described above demand adherence to good construction practice in regards to foundation backfill and site drainage. A qualified contractor should be used to ensure that these practices are followed which include but are not limited to the following requirements.

- Ensure that surface water is directed away from the building with proper eavestroughing, downspouts and site grading.
- Install effective granular fill, weeping tile and other components to produce a drainage system that properly directs water away from behind the foundation wall.
- Backfill with proper materials and with care.
- Properly support foundation walls at top and bottom prior to backfilling (common practice of backfilling concrete basement walls prior to installation of main floor joists is unacceptable with structurally insulated panel walls).

Safety Factors

The conclusions of this report are based on successful test loading of the panels at three times the specified loads.

Limitations

Titan Wall panel design, fabrication and construction must be reviewed on every project by a licensed structural engineer. Complexities of project to project conditions demand that said engineer analyze and understand all aspects of the Titan Wall construction system as well as the testing procedures and results performed by both independent agencies and Titan Wall in-house testers. All construction materials have inherent strengths and weaknesses – these weaknesses must be understood thoroughly by the engineer and designed for. Heninger Structural Engineering is prepared to provide required engineering services as described but will not take responsibility for the design, review, or analysis of others.

The intent of this report is to provide the client with an understanding of the conclusions and opinions held by Heninger Structural Engineering. It is not the intent of this report to influence the analysis and conclusions of other engineers who should draw their own conclusions independently.

This report is not intended to be used in application to building authorities on individual projects. Building authorities should expect project specific shop drawing submittals reviewed, sealed and stamped by the responsible engineer.

Conclusions

Based on the above, it is our opinion that the 8'-0" or 9'-0" Titan Wall panel systems are sufficient to carry up to 3000 pounds per lineal foot of specified axial load in combination with up to 6'-6" of backfill. Project to project conditions may result in differing limitations.

Testing of the Titan Wall panel system is an ongoing process. As a result, conclusions are subject to change as additional results become available. All previous reports and conclusions issued by Heninger Structural Engineering should be deemed obsolete and should not be used. This report shall be considered up to date and effective to the end of year 2008 only – or upon issuance of a subsequent report by Heninger Structural Engineering. Please contact the undersigned to confirm that no subsequent revisions have been issued.

Regards,

Jim Heninger, P.Eng.
Heninger Structural Engineering

