

PROFESSIONAL ENGINEERING INSPECTIONS, INC.

P. O. BOX 859
FRIENDSWOOD, TEXAS 77549
<http://www.profengineering.com>
Firm Registration #1503
(713) 664-1264

FOUNDATION QUALITY INSPECTION REPORT

Mr. John Smith
1234 Myword Dr.
Houston, Texas
May 24, 2017

I. INTRODUCTION

A. Property Description

The property inspected is a house, which will have wood framing, brick veneer and fiber cement siding, a composition shingle roof, and a post tension cable reinforced slab on grade foundation.

B. Purpose

The purpose of this inspection was to make visual on-site observations of the workmanship evident in the construction of the building foundation. The information will be used as a basis for an opinion of the apparent quality of workmanship which will be provided in this report. A list of the observed irregularities and suspected defects will be provided as a part of the report. There will also be a separate list of some of the most significant irregularities even though the irregularities may not be very important. Most of the observed irregularities will be in need of repair or correction to some extent, but it is suggested that the extent and need for repair be discussed with the general contractor responsible for the construction of the property. This list of anomalies is not claimed to be a complete list of irregularities that exist, but a representative list used to form the opinion which is the basis for this inspection.

C. Scope

On-site visual observations were made of the foundation construction preparations and installations with the intent of determining the apparent quality of the foundation and the workmanship related to the construction. This inspection does not include review of the building design or design of any component of the building either completed or planned as of the time of the inspection. The design of the building is considered the responsibility of the builder and/or the engineer or architect who prepared and approved the plans for construction. There is no intent to determine if plumbing or other rough-in preparations are properly placed with respect to the finish components of the building. Placement of rough-in items is the responsibility of the craftsman and supervisor responsible for the project. This information is provided for the use of the person to whom this report is addressed and is in no way intended to be used by a third party, who may have different requirements.

The photographs included in the photo attachment to this report and referenced by some items in the report are only intended to provide a general representation of the condition discussed in the referencing paragraph. The referenced photographs do not necessarily represent all locations where described conditions exist and such should not be assumed. Photographs are taken at the discretion of the inspector and are not provided for all irregularities observed during the inspection or included in this report.

II. Opinion

A. Quality of Workmanship

The quality of workmanship indicated in the fabrication of the foundation appears to be slightly below the workmanship found in the foundation of most buildings of comparable size and price in this area due to the observed irregularities including evidence that organic materials were not removed prior to placement of fill material at a portion of the foundation. The number and degree of observations of incomplete, improper, or defective workmanship listed in this report are the basis for this opinion.

B. Significant Exceptions

The following exceptions are some of the more significant of the anomalies noted that have a bearing on my opinion of the quality of workmanship indicated in the building:

1. There was a layer of organic material observed between the virgin soil at the site and the fill soil which appeared to be the original forest floor. The observed debris included braches and leaves. This material should have been removed before placement of the fill because it may result in differential movement of the building's foundation in the future. This is an indication of poor site preparation, which may require reworking of the fill and should be brought to the attention of the engineer of record and/or the soils engineer who can make specific recommendations for further testing to determine the quality of site preparations if testing has not already been performed and corrective actions that may be necessary.
2. The vent pipe for the shower area at the east side of the forms was not identified. Independent plumbing vents for each drain appeared to exist except at this location. The existence and location of each vent should be verified prior to placement of concrete. If a vent does not exist or if "wet venting" is improperly implemented, it can result in siphoning of the drain trap allowing sewer gasses in the building after construction.
3. Tendons were more than 3 inches above the bottom of the beams at some locations. The tendons were measured to be 8 inches above the bottoms of the beams for long distances at the north section of the foundation and at the south grade beam. This may require

modification of the depth of the beams where pipes interfere with proper placement and should be brought to the attention of the engineer of record if significant additional depth is required.

4. There were openings observed to be located within the high stress zone behind the anchor of a tendon. The area 18 inches behind the anchor and at an angle of 45 degrees from the back of the anchor should be free of items that could cause failure of the concrete. The presence of the opening may result in a blowout during tensioning activities. The engineer of record should be consulted for special provisions where penetrations are necessary in this area.

III. OBSERVATIONS

The following observations are not claimed to be all the irregularities that existed during the inspection, but a representative list of observations made that form a basis for the quality of workmanship opinion:

1. Differential settlement of building foundations is a common problem in the greater Houston area because of soil and weather conditions. As a building ages, no matter how well it was constructed or what its present condition is, the foundation will probably continue to experience differential movement. Constant care should be taken to help maintain that movement to a minimum. If the building is to be left unoccupied for an extended period of time, provision should be made to have the yard watered frequently during dry periods. See attached Foundation Care Information sheet for suggestions.
2. Grading of the soil to obtain acceptable drainage at the perimeter of the foundation has not been implemented. It is recommended that the yard grading be accomplished in accordance with the recommendations contained in the attached Foundation Care Information sheet. The soil should be graded to slope away from the edge of the foundation with a slope of at least 1 inch per foot for approximately 4 feet, and there should be at least 4 inches between the surface of the soil and the top of the floor or concrete deck in the building. Reference Photograph 1
3. There are large trees growing near the building site that may adversely affect the performance of the building's foundation. Construction research has indicated that the foundations of buildings resting on expansive clay soil are adversely affected by trees that grow closer to the building than their mature height. If the soil on which the building rests has been determined to be expansive clay, a qualified tree expert should be consulted to determine if it is practical to cut and cap the tree roots. If it is not practical, the trees should be removed. Large trees have been known to adversely affect the foundation performance even if the building has been constructed on piers and with great care.

4. The trenches for forming the grade beams were caved in at some locations and must be cleaned prior to casting the concrete slab. Where soil fills parts of the trenches, the grade beam dimension will be reduced to an undesirable amount.
5. No sleeves had been installed at the plumbing penetrations of the concrete slab or beams. Sleeves are necessary to prevent the concrete from chemically damaging the pipe and from being so tight around the pipes that damage can occur. Reference Photograph 2
6. Provision should be made for obtaining test samples of the concrete when the foundation is cast, and as well as provision for slump testing the concrete to ensure it is poured at the proper consistency.
7. As of the time of this inspection, the foundation was not ready to be cast since reinforcing cables for the foundation were resting on or against the ground. The cables must have approximately 3 inches between the soil and the cables at the bottoms of the beams, 2 inches to the soil at the sides of the beams, and 1 ½ inches between the cables and the bottom of the slab.
8. The fixed ends of the reinforcing tendons were in contact with the forms. The cables should be installed hung against forming nails to ensure a minimum of ¾ inches between the ends of the tendons and the surface of the finished concrete. Failure to properly install the cable ends can result in corrosion failure of the anchor point, leaving a portion of the foundation without sufficient reinforcement. Reference Photograph 3
9. Plumbing lines occupied the bottom of grade beam trenches and affecting the proper placement of the reinforcing cables. This may affect the performance of the cables and their ability to provide sufficient reinforcing to the beams. Reference Photograph 4
10. Tendons were more than 3 inches above the bottom of the beams at some locations. The tendons were measured to be 8 inches above the bottoms of the beams for long distances at the north section of the foundation and at the south grade beam. This may require modification of the depth of the beams where pipes interfere with proper placement and should be brought to the attention of the engineer of record if significant additional depth is required.
11. The installation of the metal keyway detail at the narrow section of foundation between the house and the south garage was incomplete and should be completed in accordance with the specification detail. It appeared this may require re-setting of the steel pin bars.

12. There were openings observed to be located within the high stress zone behind the anchor of a tendon. The area 18 inches behind the anchor and at an angle of 45 degrees from the back of the anchor should be free of items that could cause failure of the concrete. The presence of the opening may result in a blowout during tensioning activities. The engineer of record should be consulted for special provisions where penetrations are necessary in this area. Reference Photograph 5
13. The protective sheathing had been excessively cut away from the tendons at the anchors to allow installation of the cables through the anchor points, leaving a portion of the tendons exposed. No more than one inch of the cable should be left exposed. The sheathing should be repaired to prevent bonding between the concrete and cable as the concrete cures, which can prevent proper tensioning of the cables. Reference Photograph 6
14. A tendon was observed to be too close or in contact with plastic conduit or plumbing in the foundation. This condition may result in damage to the conduit or plumbing when the cables are tensioned. The tendon and/or plumbing should be adjusted to eliminate this potential.
15. Cables were observed to deviate excessively from their intended path. The cables should be straightened to ensure that the cables can be properly tensioned and to reduce the introduction of undesirable stresses in the concrete. Reference Photograph 7
16. Tendons were observed to be draped down across the top of the pad edge. This condition will prevent the tendon from being properly encapsulated in the concrete which may cause the tendon to be damaged during tensioning and may result in a blowout. The pads should be trimmed or chairs added as necessary to achieve proper clearance between the ground and the tendon. Reference Photograph 8
17. A tree root had not been sufficient cut off at the south grade beam allowing it to extend into the grade beam reducing its effective width. The root should be cut at the face of the beam. Reference Photograph 9
18. The installation of the metal keyway detail at the narrow section of foundation between the house and the south garage was incomplete and should be completed in accordance with the specification detail. It appears this may require re-setting of the steel pin bars. Reference Photograph 10

19. Reinforcing tendons were in contact with the sides of the beams where the double tendons spread at the bottoms of the beams to attach at the forms. It is required that there be a 2 inch coverage at this location and there is a need to modify the beams to accommodate this spread. Reference Photograph 11
20. There was a layer of organic material observed between the virgin soil at the site and the fill soil which appears to be the original forest floor. The observed debris included braches and leaves. This material should have been removed before placement of the fill because it may result in differential movement of the building's foundation in the future. This is an indication of poor site preparation that may require reworking of the fill and should be brought to the attention of the engineer of record and/or the soils engineer who can make specific recommendations for further testing to determine the quality of site preparations if testing has not already been performed and corrective actions which may be necessary. Reference Photograph 12
21. The dead ends of tendons terminating inside the forms were set too high and should terminate in accordance with the plans that appear to specify that they terminate at the interior of the beams. Reference Photograph 13
22. The vent pipe for the shower area at the east side of the forms was not identified. Independent plumbing vents for each drain appears to exist except at this location. The existence and location of each vent should be verified prior to placement of concrete. If a vent does not exist or if "wet venting" is improperly implemented it can result in siphoning of the drain trap allowing sewer gasses in the building after construction. Reference Photograph 14
23. Brick ledges were not level at some locations and may hold water. This can increase the potential for water entry through the slab affecting the performance of interior floors and finishes. This should be corrected at locations including along the west side of the main house near the porte-cochere. Reference Photograph 15
24. Reinforcing steel was missing in the forms at some locations where it was specified at the beams, including at the north side of the building. The steel should be placed in accordance with the plans. Reference Photograph 16
25. The reinforcing bar at the mat created at the porte-cochere was not adequately supported by chairs and should be supported in accordance with the specifications. Reference Photograph 17
26. Tendon clamps were loose at the live ends or were missing clamps. The tendons should be hand tight with clamps applied and against the forming to resist movement during placement of concrete.

27. Soil was excessively wet at the tops of some pads and at the beams causing it to be soft. In some areas the tendon support chairs had sunk into the tops of the pads placing the tendons too close to the soil and not centered in the slab as required. This should be corrected and placement of concrete should be deferred until the soil has dried.
28. The beam depths were measured to vary between 26.5 inches and 24 inches at the perimeter of the building. The 24 inch depth occurred at the south west corner of the main house area and appears to be less than the 26 inch depth that appears to be specified on the plans. The plans were printed on a very small sheet which was very difficult to read. Interior beam depths were not determined because string lines had not been run for inspection by the builder. Depths should be verified to meet the minimum specification for the design prior to placement of concrete.
29. Chairs were missing where tendons pass by plumbing. Chairs should be installed to prevent contact with the plumbing, which may result in its damage during tensioning.
30. There was insufficient positioning of some steel where it was less than 3 inches from the bottoms of the beams. This should be corrected where it exists.
31. The installation of an "Ufer" ground rod was not observed in the forms.
32. It appeared there may be a lavatory drain missing at the area of the half bathroom. The placement of the lavatory drain should be verified. It is possible the lavatory will be drained into the vent of the toilet, which is less desirable than a dedicated drain and vent at this location.

IV. SPECIAL NOTICE

Opinions and comments contained in this report are based on observations of evidences of workmanship employed in construction of the foundation casting preparations inspected. Quality standards are based on knowledge gained through experience and professional studies of the inspector. Opinions related to compliance with specifications, legal, and/or code requirements are specifically excluded as being a part of our agreement to perform this inspection. There is no guarantee or warranty as to future performance, life, and/or need for repair of any item inspected, nor should same be assumed.

This is a sample document and contains no signatures. If this were an actualy engineering report signatures would be provided at this location. This document is only intended to prove a sample of the type of report we issue for a Foundation Quality of Workmanship Inspection.



1. Grading of the soil to obtain acceptable drainage at the perimeter of the foundation has not been implemented. The soil should be graded to slope away from the edge of the foundation with a slope of at least 1 inch per foot for approximately 4 feet, and there should be at least 4 inches between the surface of the soil and the top of the floor or concrete deck in the building.

2. No sleeves had been installed at the plumbing penetrations of the concrete slab or beams. Sleeves are necessary to prevent the concrete from chemically damaging the pipe and from being so tight around the pipes that damage can occur.



3. The fixed ends of the reinforcing tendons were in contact with the forms. The cables should be installed hung against forming nails to ensure a minimum of 3/4 inches between the ends of the tendons and the surface of the finished concrete. Failure to properly install the cable ends can result in corrosion failure of the anchor point, leaving a portion of the foundation without sufficient reinforcement.



4. Plumbing lines occupied the bottom of grade beam trenches and affecting the proper placement of the reinforcing cables. This may affect the performance of the cables and their ability to provide sufficient reinforcing to the beams.

5. There were openings observed to be located within the high stress zone behind the anchor of a tendon. The area 18 inches behind the anchor and at an angle of 45 degrees from the back of the anchor should be free of items that could cause failure of the concrete. The engineer of record should be consulted for special provisions where penetrations are necessary in this area.



6. The protective sheathing had been excessively cut away from the tendons at the anchors to allow installation of the cables through the anchor points, leaving a portion of the tendons exposed. No more than one inch of the cable should be left exposed. The sheathing should be repaired to prevent bonding between the concrete and cable as the concrete cures, which can prevent proper tensioning of the cables.



7. Cables were observed to deviate excessively from their intended path. The cables should be straightened to ensure that the cables can be properly tensioned and to reduce the introduction of undesirable stresses in the concrete.

8. Tendons were observed to be draped down across the top of the pad edge. This condition will prevent the tendon from being properly encapsulated in the concrete which may cause the tendon to be damaged during tensioning and may result in a blowout. The pads should be trimmed or chairs added as necessary to achieve proper clearance between the ground and the tendon.



9. A tree root had not been sufficient cut off at the south grade beam allowing it to extend into the grade beam reducing its effective width. The root should be cut at the face of the beam.



10. The installation of the metal keyway detail at the narrow section of foundation between the house and the south garage was incomplete and should be completed in accordance with the specification detail. It appears this may require re-setting of the steel pin bars.

11. Reinforcing tendons were in contact with the sides of the beams where the double tendons spread at the bottoms of the beams to attach at the forms. It is required that there be a 2 inch coverage at this location and there is a need to modify the beams to accommodate this spread.



12. There was a layer of organic material observed between the virgin soil at the site and the fill soil which appears to be the original forest floor. The observed debris included braches and leaves. This material should have been removed before placement of the fill because it may result in differential movement of the building's foundation in the future.



13. The dead ends of tendons terminating inside the forms were set too high and should terminate in accordance with the plans which appears to specify the at the interior of the beams.

14. The vent pipe for the shower area at the east side of the forms was not identified. Independent plumbing vents for each drain appears to exist except at this location. The existence and location of each vent should be verified prior to placement of concrete. If a vent does not exist or if “wet venting” is improperly implemented it can result in siphoning of the drain trap allowing sewer gasses in the building after construction.



15. Brick ledges were not level at some locations and may hold water. This can increase the potential for water entry through the slab effecting the performance of interior floors and finishes. This should be corrected at locations including along the west side of the main house near the porte-cochere.



16. Reinforcing steel was missing in the forms at some locations where it was specified at the beams, including at the north side of the building. The steel should be placed in accordance with the plans.

17. The reinforcing bar at the mat created at the porte-cochere was not adequately supported by chairs and should be supported in accordance with the specifications.

