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GENERAL INFORMATION

A1 Name and Address of Client

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A2 Address of Property





A3 Date of Inspection

01 Dec 2018

A4 Inspected by

C.Eng. Kemal Taşhan – Member of UCTEA, Chamber of Civil Engineers ID. No: 62905

A5 Client's Brief

Tashan Construction & Design was requested to carry out an Engineers Survey of the above mentioned property. This survey was required to record the current condition (by visual inspection only) of the property.

A6 Use of Report

This report is for the use of to record the current condition of the property on future remedial works.



INTRODUCTION

B1 Introduction



B2 Scope of Survey

As stated previously this survey was conducted to record the visual current condition of the property on the day of inspection. Our client requested us to conduct this survey in order to report damp and condensation problems throughout the property. The property is also reported with sewer system and drainage problems. As being a brand new property, the survey will take into consideration globally accepted construction standards when commenting on the problems reported.

B3 Survey Procedures

The survey took the form of a visual inspection and has been categorized under 3 main articles. Damp and condensation problems throughout the lower ground floor, damp problems in the two selfcontained bedrooms, sewer system and drainage problems.

B4 Restrictions during Survey

None. Property managers were available at all times prior to visual inspections.



DETAILS OF SURVEY

C1 Lower Ground Floor (app. 300 m² of covered space & 850 m³ of volume)



It has been inspected that total covered space of m² in lower ground floor is not designed with enough and proper sized doors and window frames. It is obvious that the lack of fresh air flow is a remarkable reason of the humidity problem and not the only one. The structure is completed without consideration for controlling humidity by technical devices, ductwork systems, vapor barrier, negative pressure and mechanical space to name a few.



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Indoor pool area is degined with a thought of *'it's just another room'* which is an effective reason of the mentioned problem. It is surrounded by floor-to-ceiling glass panels which is a clear sign of no vapor barriers installed to keep the moisture and vapors from the rest of the lower ground floor. The property has suspended ceilings all over the lower ground floor including the indoor pool area. It is generally accepted that suspended ceilings in swimming pool areas are a typical call for trouble. Moisture can move into the dead air space above the ceiling and proceed to disrupt the structure area above. It can also jump to other areas of the building. Therefore, any potential dead air space areas must be considered part of the overall environment and must be designed to remove the humidity. When a suspended ceiling is in place, it is recommended to ventilate with pool room air and ensure it is insulated above it.

Leaving the sliding doors open in pool area will help reducing condensation but obviously will not preferred for safety reasons. Condensation is aggressive and will attack many materials by leaching the minerals out of the surface it forms on.

Without further attention, it will cause accelerated oxidation on the metal surfaces, creating rust stains on reinforcing bars in far future. In close term, it will cause warping, rot, mold, mildew, rust or simply saturate the material until it loses its integrity which some of these problems have already been reported by the property managers.

C2 Self-Contained Bedrooms

Problems reported in Bedroom 6 & 7 are mostly like to be a typical penetrating damp issue. The two main reasons for dampness in areas such like are:

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- 1. Moisture can't escape
- 2. Water is getting in

Without having visual data such as photographs taken at the construction stage, it is not possible to know what insulation methods and materials have been used to protect the reinforced concrete wall from damp and ground-water. It is also not known if there's a proper drainage system has been installed to discharge ground-water or/and rain water to avoid humidity problems.

It's necessary to understand where the water is coming from and which factors allow it entering the area. There are usually 3 sources of moisture:

- 1. Liquid water from rain or ground-water.
- 2. Interior moisture sources such as humidifiers, unvented clothes dryers, bathrooms and cooking, as well as the moisture in concrete after construction.
- 3. Exterior humid air that enters the basement and condenses on cooler surfaces.

In our case, it seems like the source of humidity is water from rain or ground-water but the property managers have stated that the problem occurs more effectively in hotter periods of summer. This could be a sign of exterior humid air entering in and condensing on cooler surfaces causing moisture.



C3 Sewer System and Drainage Problems

A home sewer can encounter many problems. However most house sewer lines run trouble free for long years and need no maintenance.

The four main type of problems encountered with the drain lines are:

- 1. Roots in a sewer line
- 2. Damaged or disconnected pipe
- 3. Back pitched house drain piping
- 4. Disposal of improper items down a drain

In our case, we know there are two separate drain pipe lines meeting at the same concrete manhole ring placed in the garden. Property managers have reported only one of these drain pipe lines caused wastewater overflow inside and sewer gases rising into the property.

With the visual data provided by the property managers, it is suspected that the reason of the mentioned problem is a back pitched house draining pipe. However, a second reason could easly be disposal of improper items in the toilets. It is also necessery to understand that main drain pipe lines or any horizontally placed waste pipes should be installed with the correct downward slope. On too flat a slope, the water will slow down, allowing the solids to settle out in the waste pipe. On a steeper slope than maximum allowed, the water will flow away from the solids. In this case the solids will stay in the waste pipe causing further wastewater pushed back inside the property.



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CONCLUSIONS AND RECOMMENDATIONS

D1 General Discussion (Please see details in report)

D2 Damp and Condensation Problems throughout the Lower Ground Floor

An indoor pool will create a very humid area if it doesn't have a proper source of fresh air, exhaust, and dehumidification system. This will result as mold or mildew growth.

If these are not in place and working properly, the pool room will become wet very quickly due to the evaporation of the water. As a side effect, without a good supply of fresh air and a strong exhaust system the level of chlorines will increase rapidly causing the pool needed to be shocked more often.

To avoid indoor pool humidity problems, a relative humidity of 50% to 60% is recommended. The general rule for pool dehumidification systems is to maintain the air temperature at 2 degrees higher than the water temperature. This does not sound like much but obtaining this 2 degrees difference is vitally important.

Further advices have been recieved from two different companies speciliazed in heating, ventilation, air conditioning systems and dehumidifiers. According the the advices of MSG HVAC Systems based in Antalya and Mavi HVAC & Dehumidifiers based in Ankara, having a correct size dehumidifier for the pool area will reduce the problem. On top of that, a ducted environmental control system for the rest of the entire floor to run in cooperation with the pool dehumidifier will be the only solution to eliminate the problem completely.

It is known that the most important technical factor between an indoor pool and an outdoor pool is the exhaust and fresh air flow issues. Representatives of both companies confirms that when dealing with humidity problems caused by an indoor pool, the correct way to deal with the problem is simply to create a solution of **'fresh air in and exhaust out'**. A dehumidifier itself will only exhaust the humid air out but it won't provide the fresh air coming in.

D3 Damp Problems in the Two Self-Contained Bedrooms

The cost of preventing problems in the design stage is much less than the repair costs down the road. Beyond it's financial side, sometimes it is not even technically possible to fix the problem at 100% level after the construction of the property is completed. In our case, it is not possible to reach the other side of the reinforced concrete wall to fix or replace the insulation. While fixing the mentioned problems, any insulation applied from interiors will not be completely successful regardless which method is used but it will help reducing the problem. A combination of various remedial works will help fixing the problem by 50% to 80%. These can be listed as:

- 1. Applying water repellents on existing walls where the cupboards are placed.
- 2. Building a cavity wall with proper insulation using mineral wool.
- 3. Creating a crawl space through the suspended ceilings and a ventilation shaft on side wall as shown on the diagram. Installing a continiously operating fan to extract humid air if necessery.



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4. Building ventilation shafts over the sliding doors but this should be done with combination of installing portable dehumidifiers in each room. Same as the lower ground floor, ideal way to deal with the problem is to install a ducted system as shown on the diagram below.



D4 Sewer System Blockages, Overflows and Smell Problems in the Property

Ideal slope varies depending on the diameter of the pipe but it is accepted to be %0.5 min. and 1% max. for branch and drain pipe lines in a house sewer system. We know there's a drain pipe in the garden with an app. length of 12-13 meters and the slope of this pipe should be checked and made proper if necessery. As mentioned in the report, a steep slope exceeding the standards allowed will be as important as a back pitched pipe causing wastewater inside the property.

Also vital to a house sewer functioning properly is a house trap. It is required to be installed on the end of a house drain where the check valve is and before the start of the municipal sewer mains system. A house trap creates a water barrier in it's bottom which prevents sewer gases not to enter a property from the public sewer.

All the water traps in the drain line between each fixture in the bathrooms and the main stack are advised to be checked and made proper if necessery. The purpose of these water traps is to hold standing water which seals the drain system and prevent sewer gases coming into the property through fixtures.



Note.

While the survey was carried out in as much detail as was possible without undergoing any destructive tests it must be pointed out that work covered up including foundations and reinforced concrete walls were not inspected. The survey did not enable us to reach any conclusion regarding the presence of existing insulation methods used and materials preffered therefore no responsibility will be accepted for such. Furthermore there is also the possibility of the nonapparent presence of the above defects.

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D5 Signature





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APPENDIX A – PHOTOGRAPHS



Rusty aluminium plaster corner profile & damp stains on wall and ceiling



Damp stains in lower ground floor bedroom

Damp stains on suspended ceiling









Poor condition of walls behind fitted cupbords in Bedroom 6 & 7



Defective backing board due to mold & mildew Mold behind bed headboard Kalkan Mah. Lale Sok. No:6/C 07960 Kaş / Antalya – TURKEY Tel/Fax : +90 242 844 1355 / Mobile : +90 532 425 0934 info@kalkanredesign.com www.kalkanredesign.com