

Roof Inspection Report



File Number: 05-15-RF-001

Client: Condominium Association of Subject Property

Status of Property: occupied

Type of Property: Five story condominium (59 units)

Square Footage: 15,000± Total SF of flat roof surface (not verified)

Age of Roof: 1975± (not verified)

Date of Inspection: 04/21/2006

Time of Inspection: **Start:** 11:30 AM **Finish:** 12:30 PM

Weather conditions today: 87° F, Clear

Recent weather conditions: no significant precipitation (within last 48 hours)

Inspector: Craig P. Milliken, PE # 32779

Phone: (561) 866 9956

Scope of Inspection: This roof inspection was requested by the Condominium Association to determine the following:

1. Assess the overall condition of the roof
2. Make recommendations to the owners of the subject property

The roof was visually inspected on April 21, 2006 from walking the top surface of the roof. The subject property has not had any significant rainfall for several months prior to this inspection.

History

This roof is thought to be original and was likely installed in the mid 1970's.

Recent hurricane force winds damaged approximately 1800 SF of roofing materials on the SW corner of the subject property. The storm also damaged the roof tiles on the mansard that surrounds the roof. The condominium owners have an ongoing contract with a local roofing company to maintain the roof. Repairs on this 1800 SF area at the SW corner of the roof have been completed and the roof is currently thought to be in a water tight condition. The mansard sections have the base sheets of rolled roofing materials nailed in place. Cap sheets and roofing tiles have not yet been applied to the mansard sections. The workmanship of the recent repairs appears to have been performed at typical industry standards.

The roof has had a history of leaks over several years as stated by condominium board member Jonathan Cross. The locations of the leaks have been widespread and numerous repairs have been made.

Condition of the Roof

The roof is a flat built-up design of approximately 15,000 SF with slight pitch away from the 3 foot high concrete block parapet walls towards internal roof drains located along a centerline of the roof running east-west. Rolled roofing materials are applied along the flat surface of the roof and up the parapet walls. A mansard approximately 12 feet in depth projects from the top of the parapet walls and slants down and away from the building on all sides.

Observations indicate that the roof is formed by a poured in place concrete deck. The waterproofing materials on the flat section of the roof are approximately 3 - 4 inches thick. Typical built up roofing systems are less than 1 inch in thickness. Tapered insulation or other materials may be under the top surface of the roof creating the additional thickness. Channels approximately 3 – 6 inches wide are cut into these materials and help direct rain water towards the central roof drains.

The following concerns were noted:

- Channels are not typically found in well designed roofs. With a good roof design they are not needed. These were likely added to compensate for lack of adequate slope in the original roof design. Adequate slope is needed to move the water off the roof and allow it to dry between rains. Ponds of standing water on a roof caused by lack of proper pitch break down the roofing materials and prematurely age them.
- There are numerous patches throughout the roof. This indicates that past repairs have been frequent, numerous and likely costly.

- The surface materials on the flat sections of the roof are brittle from old age. These materials are approximately 30 years old. The original materials had a typical life expectancy of 15-20 years. Roofing materials that have lost their elasticity are susceptible to leaks from foot traffic, and stress from normal thermal contraction and expansion.
- The flat section of the roof recently had a catastrophic failure at the SW corner of the building from hurricane Wilma. Winds were widely reported to be near 100 MPH during the storm and caused the roofing materials to lift and separate from the concrete deck. Future storm force winds in this range are likely and this old roof cannot be expected to withstand them.
- The brittleness of old roofing materials make them less able to bond to form watertight seals and adhere to the concrete deck. New building codes now require better methods of attaching roofing materials to the decking. New building codes require roofs to withstand winds far exceeding the standards that were in place during the 1970's. Newer roofs are less likely to fail when stressed.
- Failures of roofing materials caused by uplift can allow water to penetrate and travel between the concrete deck and the roofing materials and become trapped. Heat from the sun will cause this trapped moisture to form gas blisters and splits in the water proofing materials. This process self-perpetuates by causing more openings for water penetration.
- There are approximately 65 condensing units on the roof for air conditioning systems. Current building code requires that any replacement unit be raised on a stand that is attached to the structure and designed to withstand hurricane force winds. All of the condensing units on the roof are currently mounted to wood blocks that are bonded to the roofing materials. Hurricane force winds push against the units and can cause tears in the roofing materials surrounding them.
- The age of this roof will make it increasingly costly to maintain and insure it. The list of willing insurance companies is diminishing and those that do offer coverage are demanding higher deductibles in this market.

Recommendations

Replacement of the entire roof should be considered. This roof has far exceeded its expected reliable service life.

The cost of full replacement will significantly exceed the cost of repairs made over the past few years; however, this roof cannot be repaired or upgraded to provide the protection that a new roof will. Insurance companies are likely to not be willing to insure the units below this roof from water damage caused by a roof failure.

Should a new roof be pursued the following points should be considered:

- All mechanical equipment will need to be raised and placed on stands. This will add a significant cost to the project but must be done to comply with the new building code.
- The roof is five stories high. This complicates material removal and replacement and adds cost.

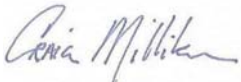
- The roof has many extra layers of added material from years of patching. This will add additional costs for removal.
- New tapered insulation should be included in the specifications to provide adequate slope to drain towards the roof drains. The amount of pitch should be shown on a roofing plan that is part of the contract.
- Optional methods of attachment of the new roof to the concrete deck should be value engineered. Higher uplift resistance ratings can lower the cost of insurance for the condominium association.
- Modified Bitumen roofing systems have been shown to be very reliable and economical in this area. Most roofing companies have the ability to install this type of material. Some companies specialize in single membrane roofing systems. The process of contractor selection needs to consider what type of roofing systems they are most familiar with.
- Coping caps should be installed on all parapet walls. Coping caps prevent water penetration through the top of the block walls. Some walls currently do not have caps. Waterproofing materials applied to these walls are cracking.
- Many sheet metal vents and rain caps over roof penetrations are corroding. All sheet metal should be replaced with a new roof.

Only large well established roofing companies should be considered for this project. The complexities listed above demand an experienced company. This is the type of project that can be underbid by a lesser experienced roofing company. Underbidding may cause them to go out of business and not complete the job.

This Roof Inspection Report is based on a limited visual inspection of the roof over the structure at the Subject Property Address. CPM Real Estate Inspections makes no warranty that all deficiencies have been identified and described in this report or that other deficiencies do not exist. Elements of the roof that are not visible or safely accessible cannot be addressed by this type of limited non invasive inspection.

This report was prepared by a Professional Engineer licensed in the State of Florida under the Board of Professional Engineers.

I certify that all information in this report is accurate to the best of my knowledge.



Craig Milliken, PE (Florida Professional Engineer License # 32779)
CPM Real Estate Inspections, Inc.



Photo # 1

Recently repaired area at SW corner of the roof. Uplift from hurricane Wilma severely damaged the roof.



Photo # 2

Mansard sections of the roof are in process of being repaired.



Photo # 3

Coping caps should be added to existing parapet walls.



Photo # 4

Corroded sheet metal needs to be replaced.



Photo # 5

All mechanical equipment needs to be raised off the roof with stands.



Photo # 6

Blisters and cracks in the brittle roofing materials are widespread.



Photo # 7

Channels in the roofing materials are not needed if the roof is properly sloped with tapered insulation.

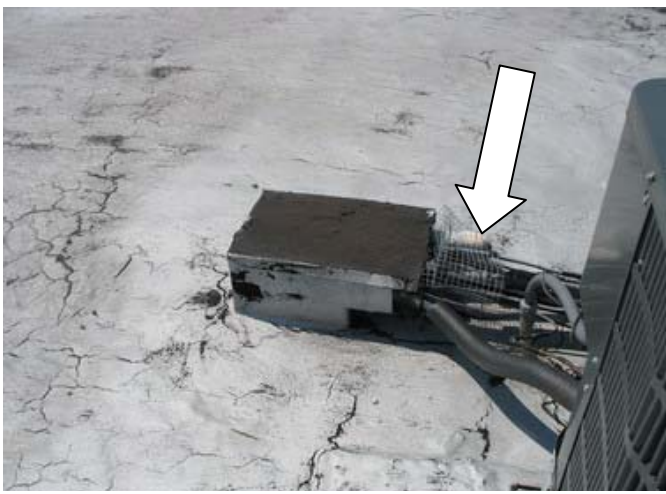


Photo # 8

New roof penetrations for refrigeration lines and electrical connections to mechanical equipment need to be designed before the roof work begins.