CASE STUDY

SINGLE-FAMILY HOME

Solving Comfort and Indoor Air Quality Issues: A Vintage Home in Miami, Florida

In this case study, we explore the experiences of a homeowner in Miami, Florida, who partnered with Comfort Dynamics, Inc., an HVAC design and contracting firm. Their mission was to address the unique challenges faced by the homeowner in their 1941 vintage residence, focusing on enhancing comfort and improving indoor air quality (IAQ).

PROBLEM

The homeowner faced several issues that made their living conditions uncomfortable and less than ideal:

1. **Temperature Fluctuations:** The home experienced temperature fluctuations, leaving the occupants uncomfortable.
2. **High Relative Humidity:** Miami is known for its humidity, and this home was no exception.
3. **Poor IAQ:** The homeowner had documented sensitivities to indoor pollutants and suspected that the IAQ contributed to their discomfort. When the homeowner purchased the house, the attic and crawl space had already been encapsulated, and he felt these issues were likely the cause of the home being "too tight."

MEASURING & DIAGNOSTICS

Comfort Dynamics took a systematic approach to address these problems:

1. **Home Performance Assessment (HPA):** Genry Garcia, the owner of Comfort Dynamics, initiated a Home Performance Assessment. This involved evaluating the home's air leakage, conducting Zonal Pressure Diagnostics (ZPD) to analyze the attic and crawl space, and profiling the home envelope for mechanical equipment impacts.

A tight encapsulated attic should have a reading of very close to zero, instead of the 25.9 value shown as measured.

2. **Blower Door Tests:** The initial blower door test revealed higher air leakage than expected, even though the attic and crawl space had been encapsulated.

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Quality Assurance Report
Single Point Blower Door Test

FAIL	Your Result: 1854.22 CFM (1854.22 CFM <= Target: 1430 CFM) Target <= 1430 CFM

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Test Results Summary

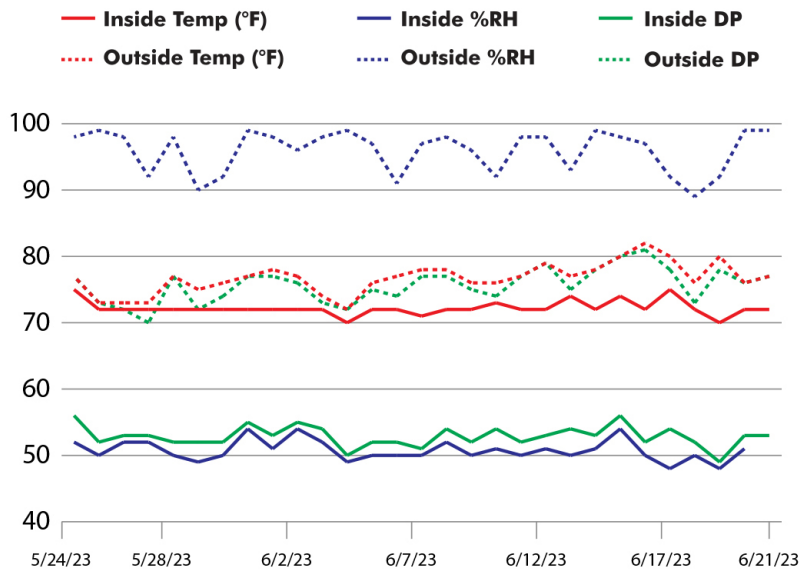
Test Type	Single Point Blower Door Test
Flow Reference Pressure	50 Pa
Time Averaging	10 seconds
Induced House Pressure	-51.08 Pa
Nominal Fan Flow	1830.54 CFM @ 50 Pa
Corrected Flow	1854.22 CFM @ 50 Pa
Air Changes Per Hour	9.725

3. **HVAC Equipment and Design:** The HVAC system was found to be oversized, leading to short cycling and reduced dehumidification effectiveness.

SOLUTION

Comfort Dynamics identified key solutions to address the homeowner's concerns:

1. **Re-encapsulation of the Crawl Space:** By re-encapsulating the crawl space, the air leakage was reduced by 302 CFM50. This helps in improving energy efficiency and preventing moisture issues.
2. **Replacement of HVAC System:** The old 3.5-ton single-stage HVAC system was replaced with a more efficient 2-ton inverter system. Inverter systems are known for their energy efficiency and quieter operation.
3. **Replacement of Ductwork:** All the ductwork was replaced, which ensures proper airflow and minimizes air leakage. This helps in delivering conditioned air efficiently throughout the house.
4. **Mechanical Supply Ventilation:** Supply ventilation through the Santa Fe Ultra98 Whole House Ventilating Dehumidifier was installed, providing 45 CFM of fresh air with MERV 13 filtration. This helps in maintaining good IAQ by exchanging stale air with fresh, filtered air.
5. **Whole House Dehumidification:** The Santa Fe Ultra98 Whole House Ventilating dehumidifier was installed to control humidity levels in the house. Excess humidity can lead to discomfort, mold growth, and other IAQ issues, so dehumidification is important for a comfortable and healthy indoor environment.
6. **Haven Central Air Monitor & Controller:** The Haven Central Air Monitor & Controller was installed to monitor and control the Santa Fe Whole House Ventilating Dehumidifier, ensuring optimal performance, comfort, and indoor air quality. This device, along with the AWAIR IAQ monitors, provides real-time data on temperature, humidity, and IAQ, allowing the homeowner to track the improvements.



The homeowner's feedback and data confirmed the success of the project:

" The house now feels more comfortable, with temperature and humidity levels well-controlled."

+ Data from the data logging thermostat and IAQ monitors indicated significant improvements in indoor air quality.
+ The comprehensive solution, addressing the house as a system, led to a satisfied homeowner and a healthier living environment.

This case study illustrates the importance of a holistic approach when addressing comfort and IAQ issues in older homes. By partnering with experts like Comfort Dynamics, homeowners can transform their living spaces into havens of comfort and health.

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