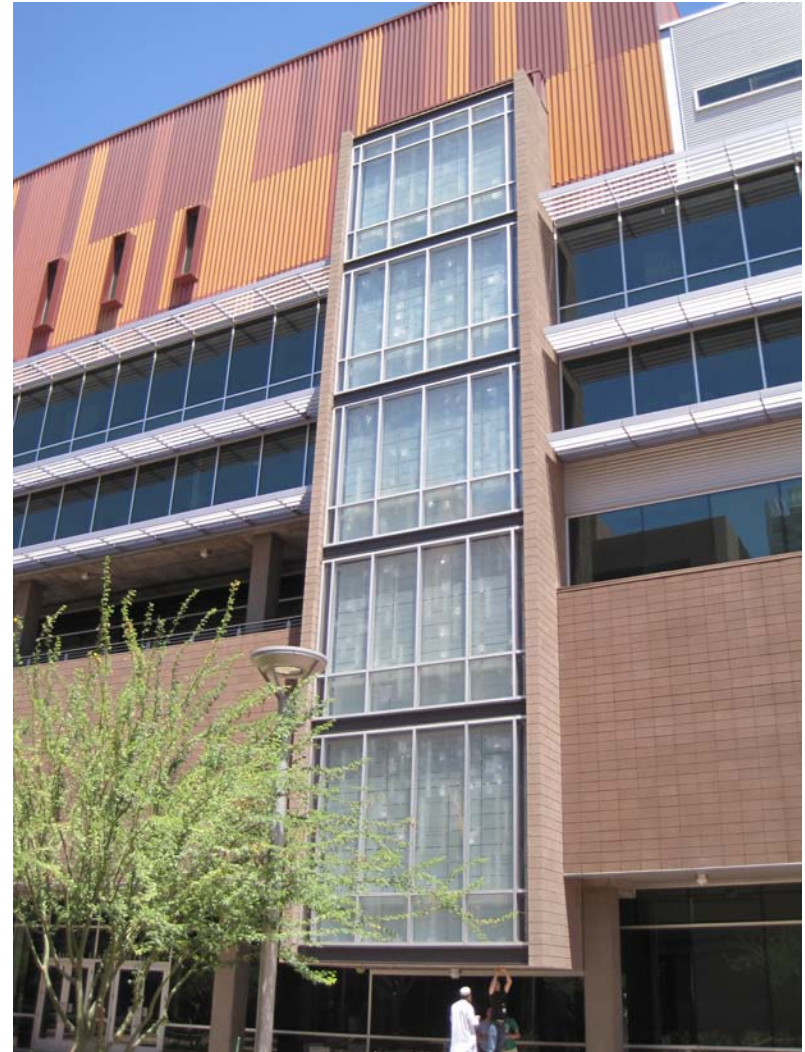


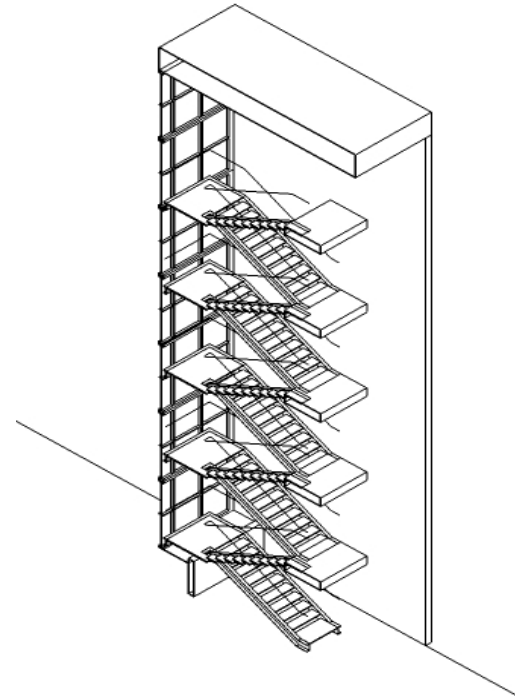
Evaluating Thermal Stack Effect in Glazed Southern Façade Staircase

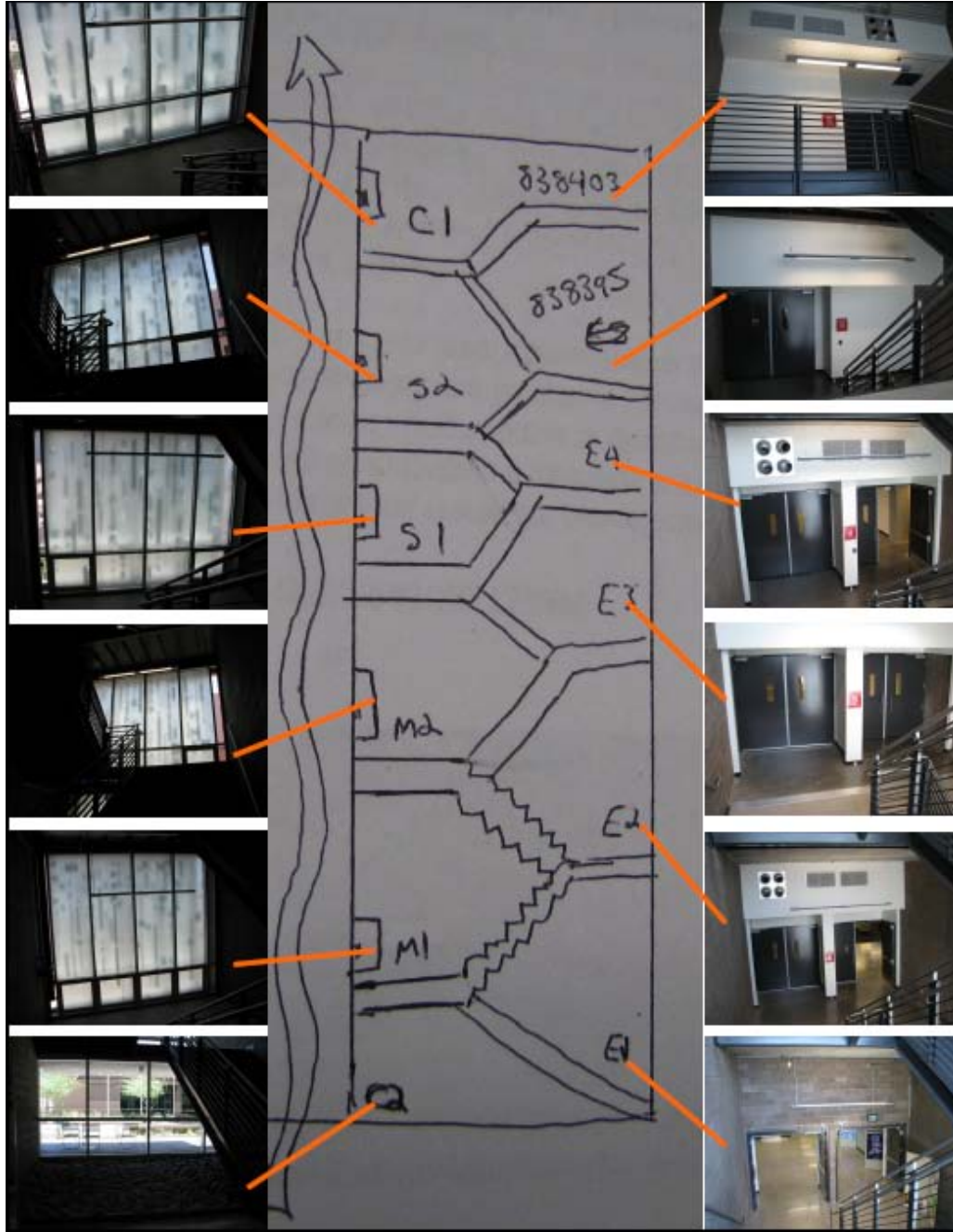
Keith Bickford
Christopher Nielson
Gary Goddard
Tom Butler
Adam Tate
ShamimJaved



Hypothesis

Stairwell temperatures are 5 °F warmer near the top of the stairwell than near the bottom of the stairwell

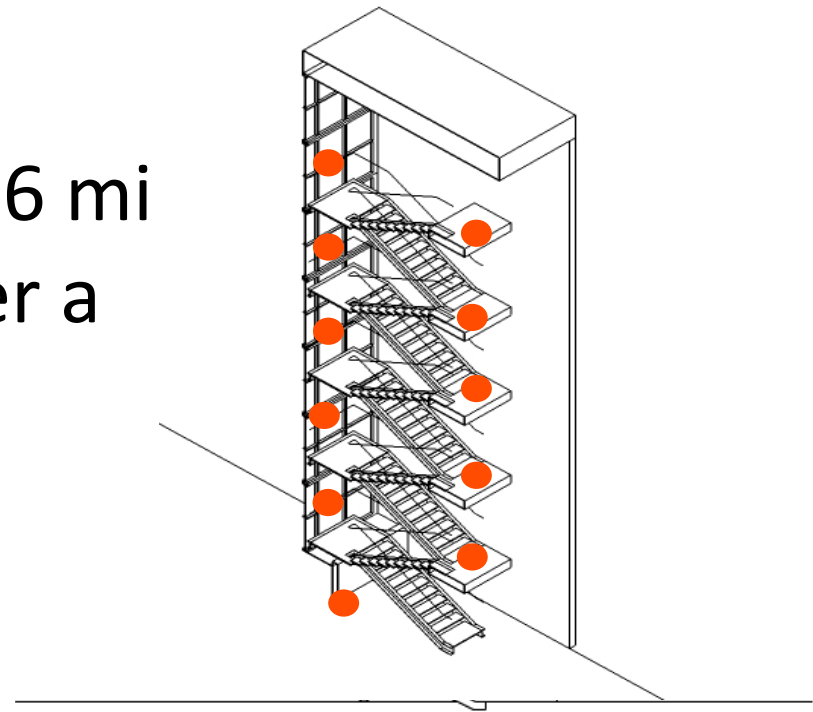




Methodology

Place HOBO U-12 data loggers at the stair entry on each floor and on the exterior wall at each intermediate landing.

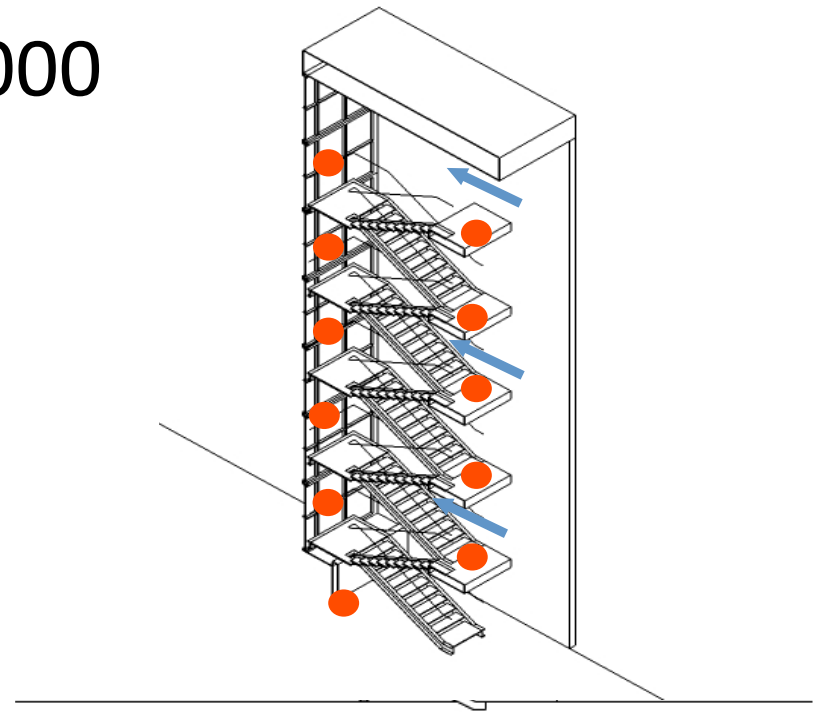
Measure temperature at 6 mi intervals and average over a one hour range.





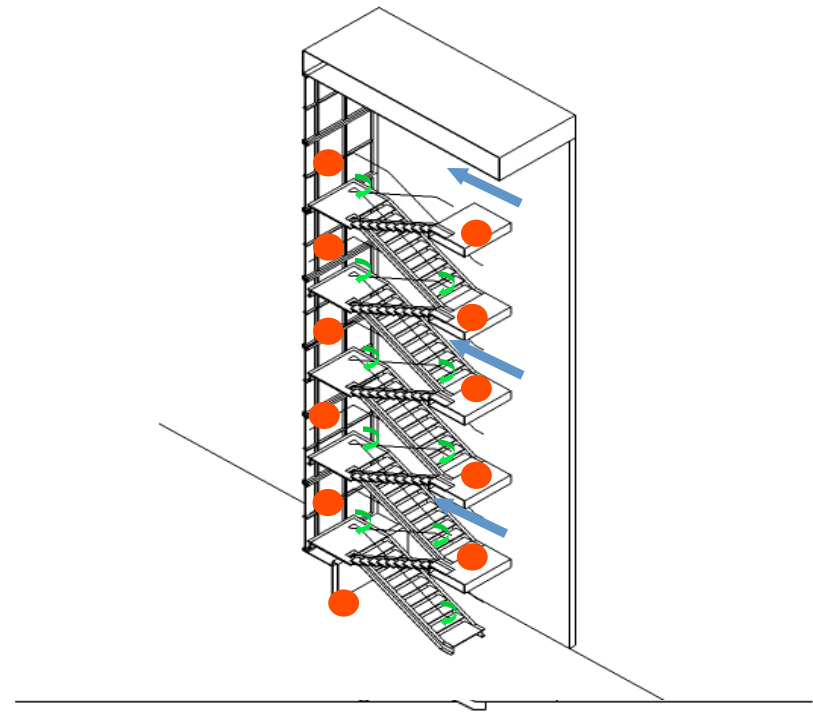
Methodology

Measure rate and temp of air-flow from FCUs above doors on the 2nd, 4th, and 6th floor landings with a Kestrel 3000 Weather Station



Methodology

Measure airflow at the handrail
with hot wire anemometer

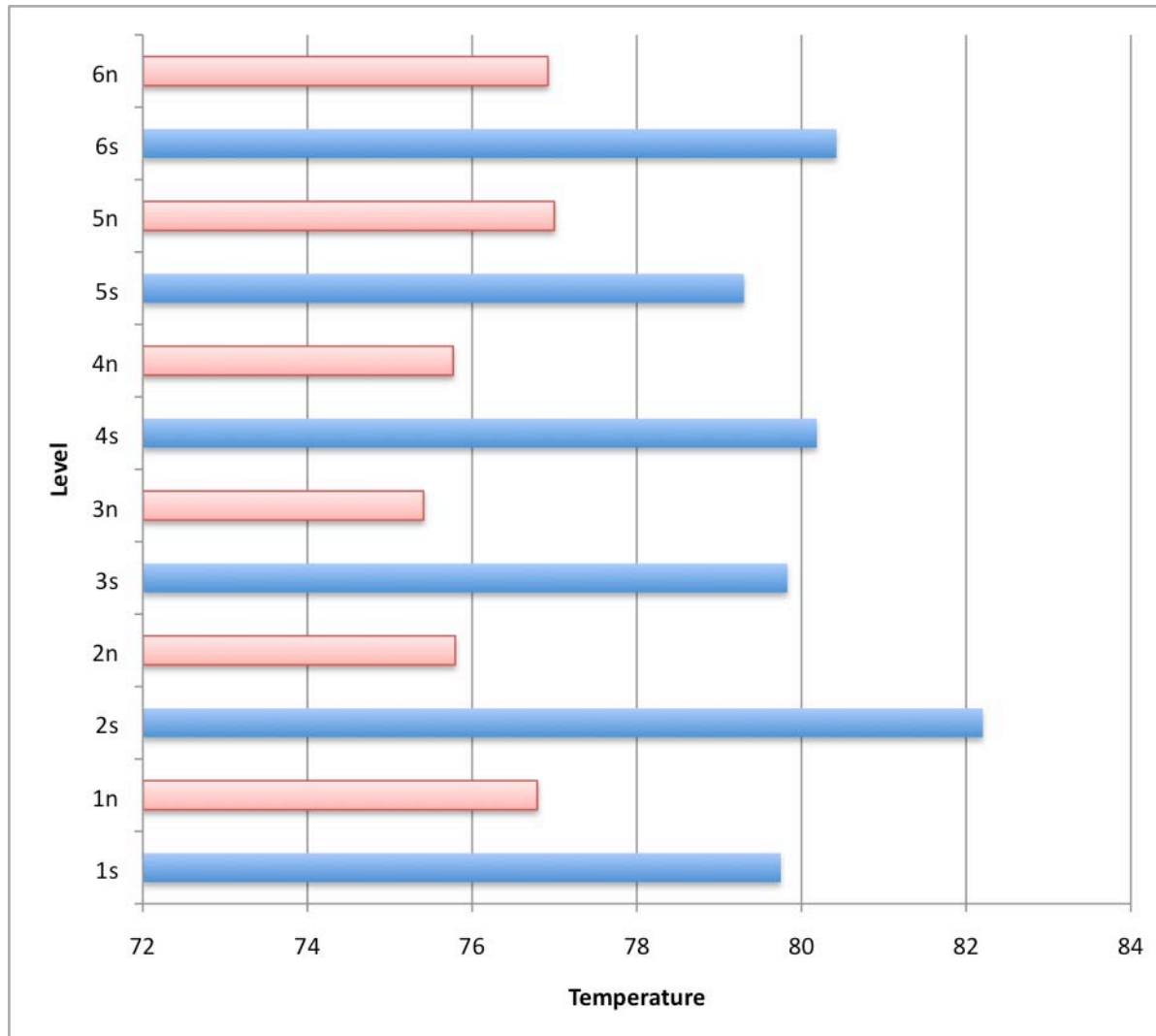


Findings

No stack effect – temperatures fluctuated at different levels

Temperature at the outside wall is higher than at the interior

Findings



Findings

	Average Temperature (°F)	Diffuser Flow fpm	Temp p	Anemomet er Flow Out	Anemomet er Flow In
Floor					
6		0	79.6	15-40	5 to 50
5				50-100	50-10
4		190	77.6	100-150	4-?
3				20-60	30
2		548	76.3	0-20	8 to 40
1				0-10	

Analysis

Forced air system over riding
passive ventilation effects

Diverse air-flow levels from
FCU's causes substantial mixing

Analysis

Bubble Test to validated air mixing.

Conclusion

Temperature does not correlate
with height in stair tower