

TRACKING (Inter-Floor Pressurization) (AFC-5)

We offer these white papers as a contribution to the growth of our industry. These ideas may or may not apply to a specific project. Please contact us for detailed recommendations.

Background

A major international financial organization required a third expansion of its World Headquarters. Among the needs for this expansion set down by the client was control of pressures not only within individual spaces on each floor but also between each floor.

Design Goals

To maintain local control of pressures within a large floor without partitions. The local pressures were controlled by closely controlling (tracking) individual flow rates.

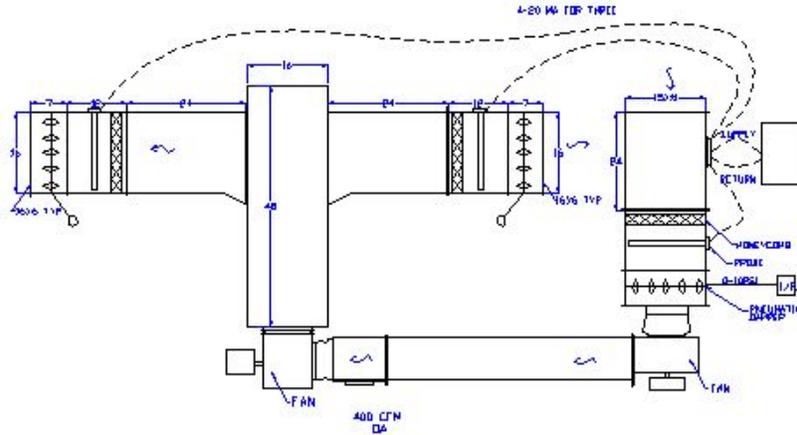
The consultant complied with their request by dividing each floor into a series of zones with its own VAV supply and return system. The each of the supply outlets was summed and the exhaust was determined by a constant offset from the supply to maintain a constant negative pressure to the corridor. The engineer specified thermal flow stations on each of the supply outlet and a pneumatic damper with a thermal flow station and a summing module for the return box. The thermal flow stations were required because of the low flow velocities at the minimum flow rates.

Each zone was required to be a semi-stand alone system ie the summing of the supply outlets and the output to the l/p on the return box was done at the return box. The building automation system monitored the operation of each zone and could adjust each set point if needed.

A mock-up was required prior to bid to validate the design. Tests run during the mock-up included minimum to maximum flow rate changes, response time to set point, repetition to maintain the offset between supply and return and repetition of the set point. The mock-up indicated that the components were able to

repetitively track and control to 50ft/min. There were well over 80 zones and 250 pieces of equipment. The commissioning (balancing) of the actual systems went as planned.

A mockup of the installation is below.



Results

TEST NO. 3						
X Axis Point on Graph	POINTS NAME: UNITS: START: DISPLAYING:	RA Dmpr Psig	Diff Setpoint CFM	Diff Reading CFM	Return CFM	Summed Supply CFM
	01-Mar-94	01-Mar-94	01-Mar-94	01-Mar-94	01-Mar-94	01-Mar-94
16	10:54:00	5.97	400.00	360.18	1,222.79	1,582.97
17	10:55:00	4.27	400.00	402.68	1,140.85	1,543.53
18	10:56:00	4.85	400.00	391.70	1,247.22	1,638.91
19	10:57:00	4.69	400.00	394.92	1,210.97	1,605.90
20	10:58:00	4.11	400.00	391.49	1,396.91	1,788.41
21	10:59:00	5.00	400.00	426.38	446.73	873.11
22	10:60:00	8.00	400.00	227.77	208.79	436.56
23	10:01:00	7.23	400.00	375.30	616.12	991.42
24	10:02:00	8.00	400.00	221.67	121.34	343.01
25	10:03:00	8.00	400.00	245.71	211.94	457.65
26	10:04:00	2.27	400.00	452.77	1,066.00	1,518.77
27	10:05:00	3.02	400.00	501.04	1,041.58	1,542.62
28	10:06:00	4.52	400.00	429.10	754	1,183.10
	TOTALS	69.93	5,200.00	4,820.71	10,685.24	15,505.96
	AVERAGE	5.38	400.00	370.82	821.94	1,192.77
	HIGHEST	8.00	400.00	501.04	1,396.91	1,788.41
	LOWEST	2.27	400.00	221.67	121.34	343.01
	Highest % of Avg	148.72	100.00	135.12	169.95	149.94
	Lowest % of Avg	42.20	100.00	59.78	14.76	28.76
	Avg % of Setpnt	NA	NA	92.71	NA	NA

