

Appendix J

ESTIMATED DESIGN WIND PRESSURE FOR JOPLIN EAST MIDDLE SCHOOL GYMNASIUM

J.1 DESIGN WIND PRESSURE BASED ON IBC 2000

- Basic design wind speed: $V = 90$ mph (3 s gust)
- Exposure category: C
- Building parameters:
 - Low-rise, with mean roof height $h = 39.8$ ft
 - Arched roof; rise-to-span ratio $r = 9$ ft/102 ft = 0.9; $K_d = 0.85$
 - 102 ft × 142.2 ft plan dimensions
 - Gust-effect factor: $G = 0.85$ (rigid building)
 - Enclosed. Internal pressure coefficient $GC_{pi} = \pm 0.18$
- Importance factor: $I = 1.0$

Net design wind pressure that corresponds to the wind parallel to ridge load case represents the worst design load case for wind uplift, with maximum design wind uplift pressure of 17.3 lb/ft² (psf) acting on the roof system. Table J-1 and Fig. J-1 and J-2 summarize the wind pressure acting on the main wind-force resisting system (MWFRS) of Joplin East Middle School’s gymnasium building based on the wind parallel to ridge load case.

Table J-1. Wind pressure acting on the MWFRS of the Joplin East Middle School gymnasium.

Surface	Z (ft)	q (psf)	G	C _p	qGC _p (psf)	Net Pressure (psf) with	
						+ GC _{pi}	- GC _{pi}
Windward	0 – 15	15.0	0.85	0.8	10.2	6.9	13.5
	20	15.8	0.85	0.8	10.7	7.4	14.0
	25	16.5	0.85	0.8	11.2	7.9	14.5
	30	17.2	0.85	0.8	11.7	8.4	15.0
	35.3	17.8	0.85	0.8	12.1	8.8	15.4
	39.8	18.3	0.85	0.8	12.4	9.1	15.7
	44.3	18.7	0.85	0.8	12.7	9.4	16.0
Leeward	All	18.3	0.85	-0.42	-6.5	-9.8	-2.9

Surface	Z (ft)	q (psf)	G	C _p	qGC _p (psf)	Net Pressure (psf) with	
						+ GC _{pi}	- GC _{pi}
Side wall	All	18.3	0.85	-0.7	-10.9	-14.2	-7.3
Roof	0 to h	18.3	0.85	-0.9	-14.0	-17.3	-10.4
	h to 2h	18.3	0.85	-0.5	-7.8	-11.1	-4.2
	2h	18.3	0.85	-0.3	-4.7	-8.0	-1.1

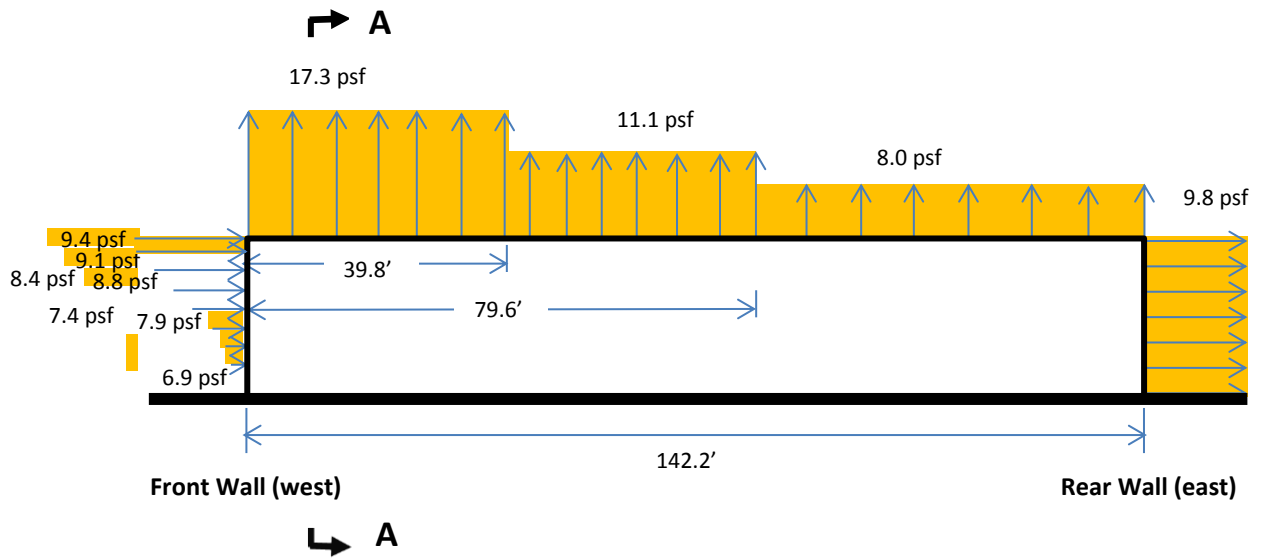
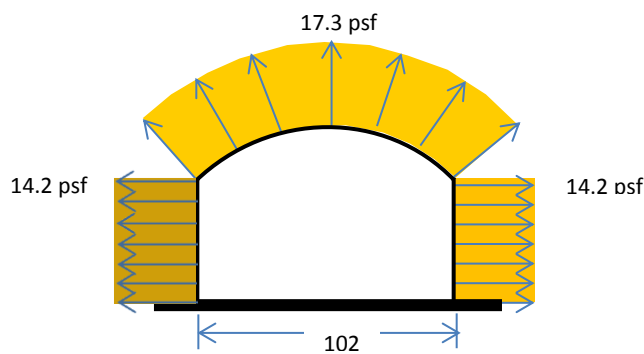


Figure J-1. Wind pressure distribution along length of the Joplin East Middle School Gymnasium.



Section A-A

Figure J- 2. Wind pressure distribution on the cross section of the Joplin East Middle School Gymnasium.