

Some Telescopes with Homologous Deformations
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S.v.Hoerner

Derived from two computer programs:

1. "Homology Iterations" (dead loads),
2. "Stress and Deformation" (external loads added).

D	λ	β	N	ΔT	$\Delta Q/Q$	n	l	W	
								radome	exposed
feet	cm	arcsec		$^{\circ}C$	per cent		m	tons	tons
30	.0025	.7	80	.06	1.7	770	.01	3	-
85	.1	10	17	.8	9	165	.11	25	100
300	2	54	10	4.5	14	60	.96	200	755
400	3	61	12	5.2	12	56	1.35	410	1600
450	4	72	11	5.4	12	51	1.65	550	1900
500	5	81	11	6.7	12	47	1.95	720	2400

Free choice:

D = telescope Diameter

λ = shortest wavelength for observation

For comparison:

β = half-power beam width

Requirements:

N = smallest number of homologous surface points (the present program is memory-limited and gives N = 13; a planned version should reach about N = 80)

ΔT = largest tolerated temperature difference in the structure (good protective paint gives about 5 $^{\circ}C$ in full sunshine)

$\Delta Q/Q$ = tolerated rms deviations of bar areas from computed values (off-the-shelf structural pipes, for example, give 10 per cent)

Surface:

n = smallest number of toroidal pannels

l = longest straight line (size of flat plates)

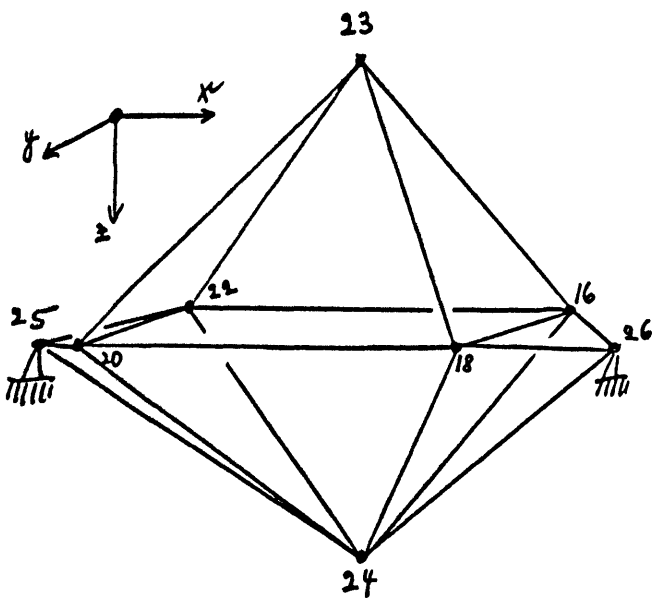
Weight (of complete elevation-moving structure: dish, surface, feed-legs) = W

radome: minimum structure for stable self-support, inside radome

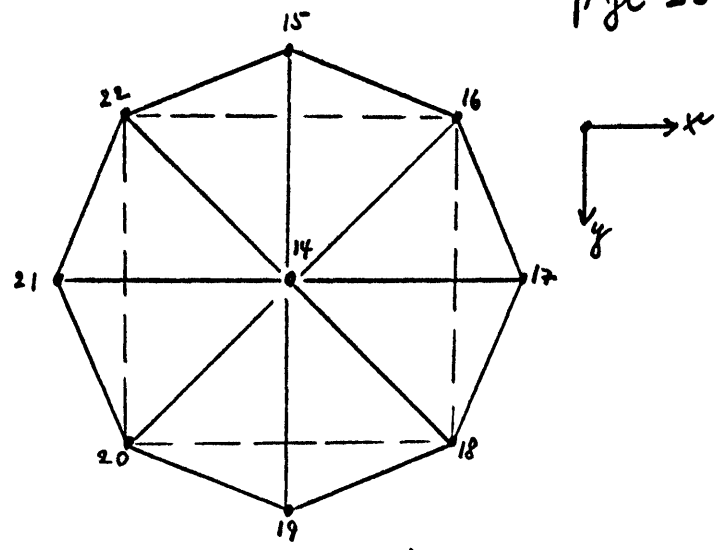
exposed: a) wind-deformation = λ/s for 17 mph on ground (22 mph at 300 ft height)

b) survival = 20 lb/ft² of snow or 4 inch solid ice, or 90 mph on ground (110 mph at 200 ft height)

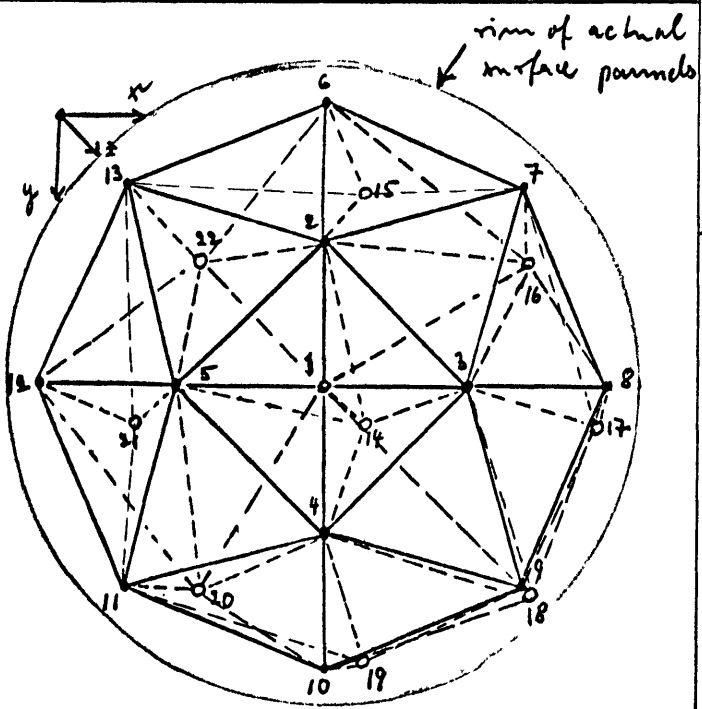
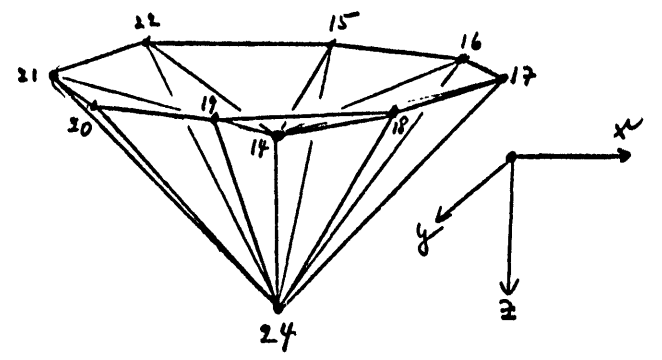
Structure 2c, 4



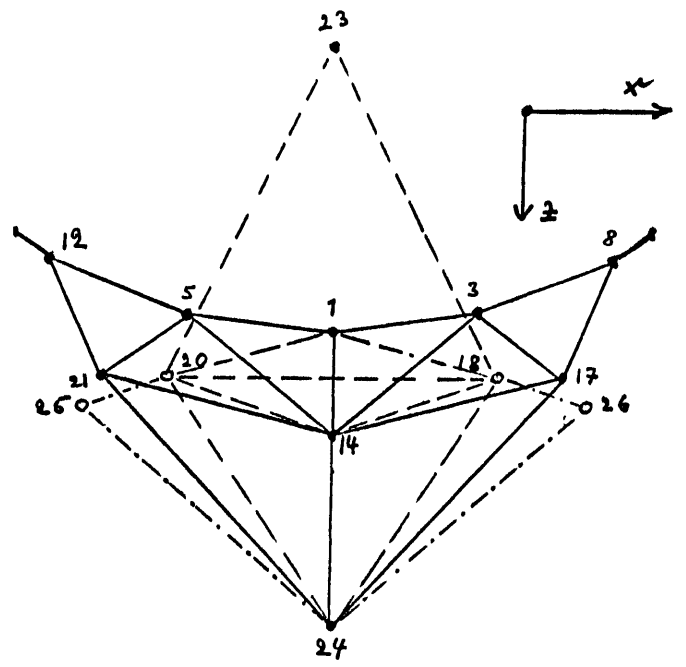
1) Octahedron and suspension (12) (6)



2) basic octagon and layer 1



3) Surface and layer 2 (28) (37)



4) Side view of plane 12-8-24, octahedron and suspension

$s = 13$	domes, surface points
$p = 26$	structural joints
$m = 112$	members

$D = 300$ ft (actual surface)
 $f = 136$ ft
 $f/D = .453$