

BCV

LBT Project: Primary Mirrors

New Honeycomb Pattern: Stress Checks in Operative Conditions (Gravity Loads)

Addendum to Rep. #157 Rev.0
Milano, November 1994

See also Rep. #156

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1. PRELIMINARIES

The pattern 94.5b of rep. #157 gives interference problems, with the mirror cell, for the actuator location #7 near the central hole; for this reason the supports #7 (double) and #44 (single) collapsed in one triple loadspreader, named #7 axial only, forming the new pattern 94.6a (figure 1).

Object of this addendum to the rep. # 157 is the optimisation of the axial force values for the pattern 94.6a when the mirror is zenith and horizon pointing; the lateral forces are mantained fixed as explained in chapter 3 of the report #157.

In the following table the optimised supporting forces are reported being:

- V_a the axial force with the mirror zenith pointing;
- V_l the corrective axial force, for the mirror horizon pointing;
- L the lateral force, for the mirror horizon pointing.

Axial forces are positive when pushing, the lateral forces are directed against the gravity.

ORIGINAL  249.6



SUPPORT PATTERN 94.6a

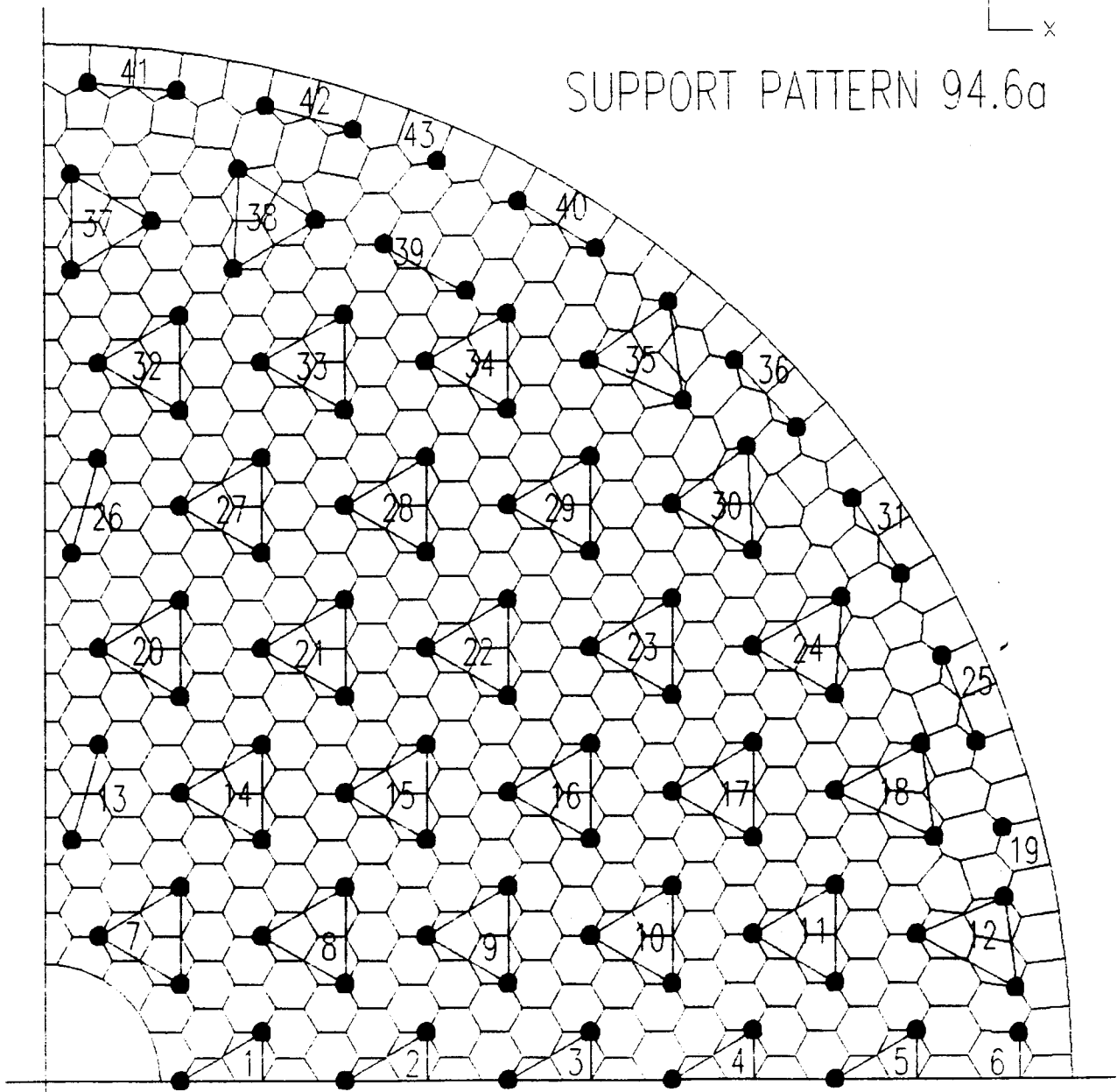


FIGURE 1

PATTERN 94.6a SUPPORTING FORCES

SUPPORT #	Va	VI	L
	[kN]	[kN]	[kN]
1	812.1	-	0.0
2	881.0	-	1548.4
3	913.7	-	1548.4
4	1041.9	-	1548.4
5	984.3	-	1548.4
6	1238.2	-	-
7	921.9	129.3	-
8	830.3	230.5	1548.4
9	903.3	-15.0	1548.4
10	984.5	32.4	1548.4
11	1066.9	-48.4	1548.4
12	1189.5	-2.4	1548.4
13	637.1	117.3	-
14	855.6	261.5	1445.1
15	917.1	-45.5	1445.1
16	961.3	90.2	1445.1
17	1029.9	-119.3	1445.1
18	1034.9	275.5	1445.1
19	467.2	-476.0	-
20	974.0	81.6	1445.1
21	897.5	56.4	1445.1
22	962.4	117.9	1445.1
23	1061.2	-73.2	1445.1
24	1173.3	70.2	1445.1
25	916.9	-612.7	-
26	733.3	-30.9	-
27	950.6	55.2	1445.1
28	1063.7	111.1	1445.1

29	1096.6	-215.8	1445.1
30	1009.1	153.5	1445.1
31	973.7	-676.3	-
32	1114.5	429.6	1445.1
33	1067.9	-185.9	1445.1
34	902.4	-153.8	1445.1
35	1279.3	-299.0	0.0
36	874.0	-884.4	-
37	1086.7	1.2	1445.1
38	1122.8	-156.2	1445.1
39	714.3	-152.1	-
40	1129.4	-707.3	-
41	1020.2	-954.6	-
42	990.2	-727.3	-
43	448.0	-201.4	-

2. OPTICAL PERFORMANCES

The optimized force values and the displacements of the optical surface are similar to those obtained for the pattern 94.5b; so the Point SpreadFunction, the Encircled Energy and the expansion in Zernike polynomials of the optical surface displacements have not been up dated.

When the mirror is ZENITH POINTING, under the effect of the supporting forces and gravity, we have obtained:

RMS respect to the bestfit paraboloid = 5.7 nm

Bestfit paraboloid parameters:

Rigid Body Axial Movement = -37.3nm

Focal change= + 343.4 nm

Peak to Valley= 54.3 nm

For the isocontour plot of the residual displacements after the bestfit paraboloid removal see the figure2.

When the mirror is HORIZON POINTING the effect of the supporting forces and gravity gives:

RMS respect to the bestfit paraboloid = 8.2nm

Bestfit paraboloid parameters:

Tilt around the elevation axis= 0 arcsec

Peak to Valley=64nm

For the isocontour plot of residual displacements after the bestfit paraboloid removal see the figure3.

ZENITH POINTING - PATTERN 94.6a

step = 10 nm

mirror scale 1/50

└──┘ neg. displ

└──┘ zero displ

└──┘ pos. displ

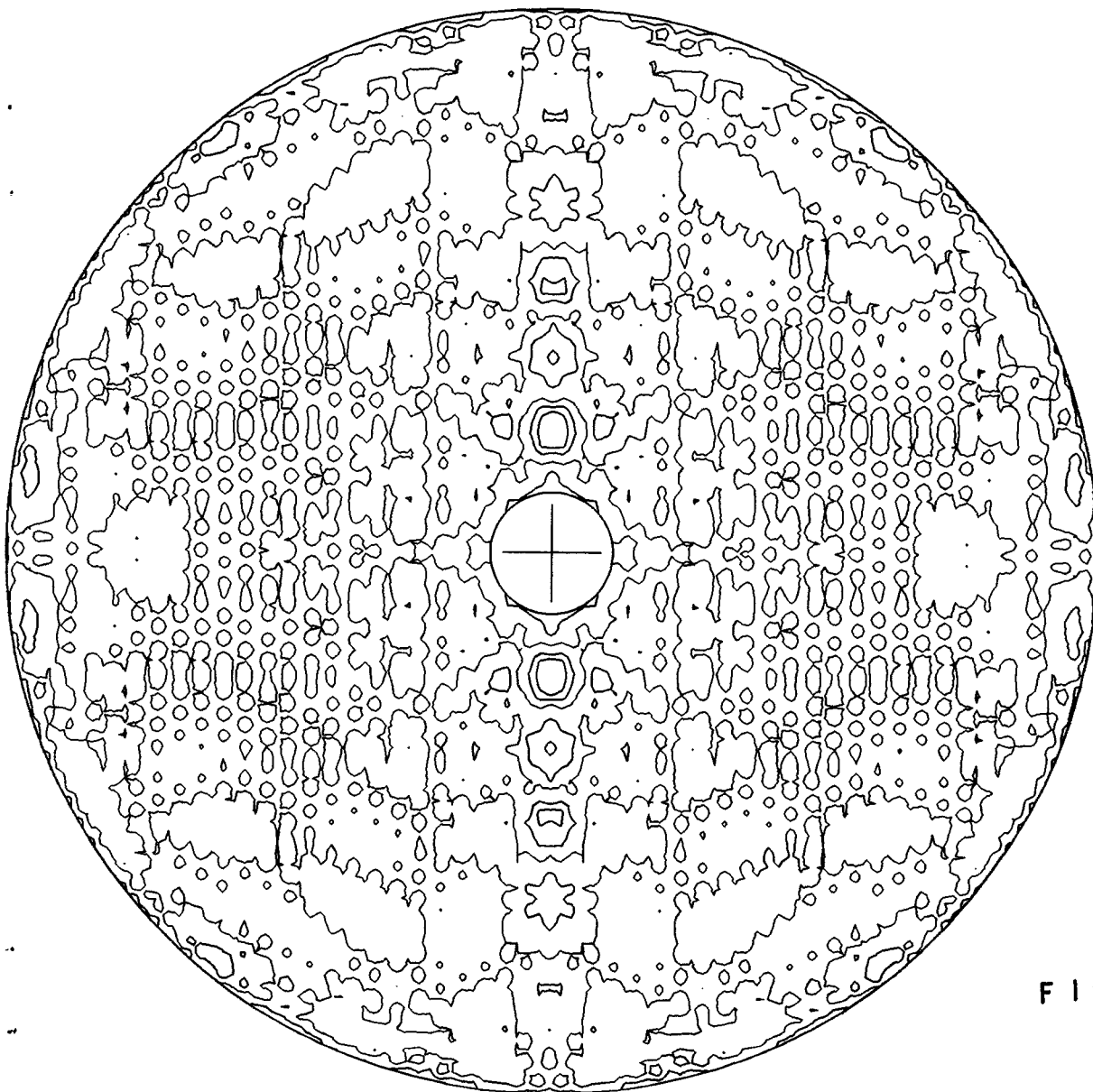


FIGURE 2

HORIZON POINTING - PATTERN 94.6a

step = 10 nm

mirror scale 1/50

└── neg. displ

└── zero displ

└── pos. displ

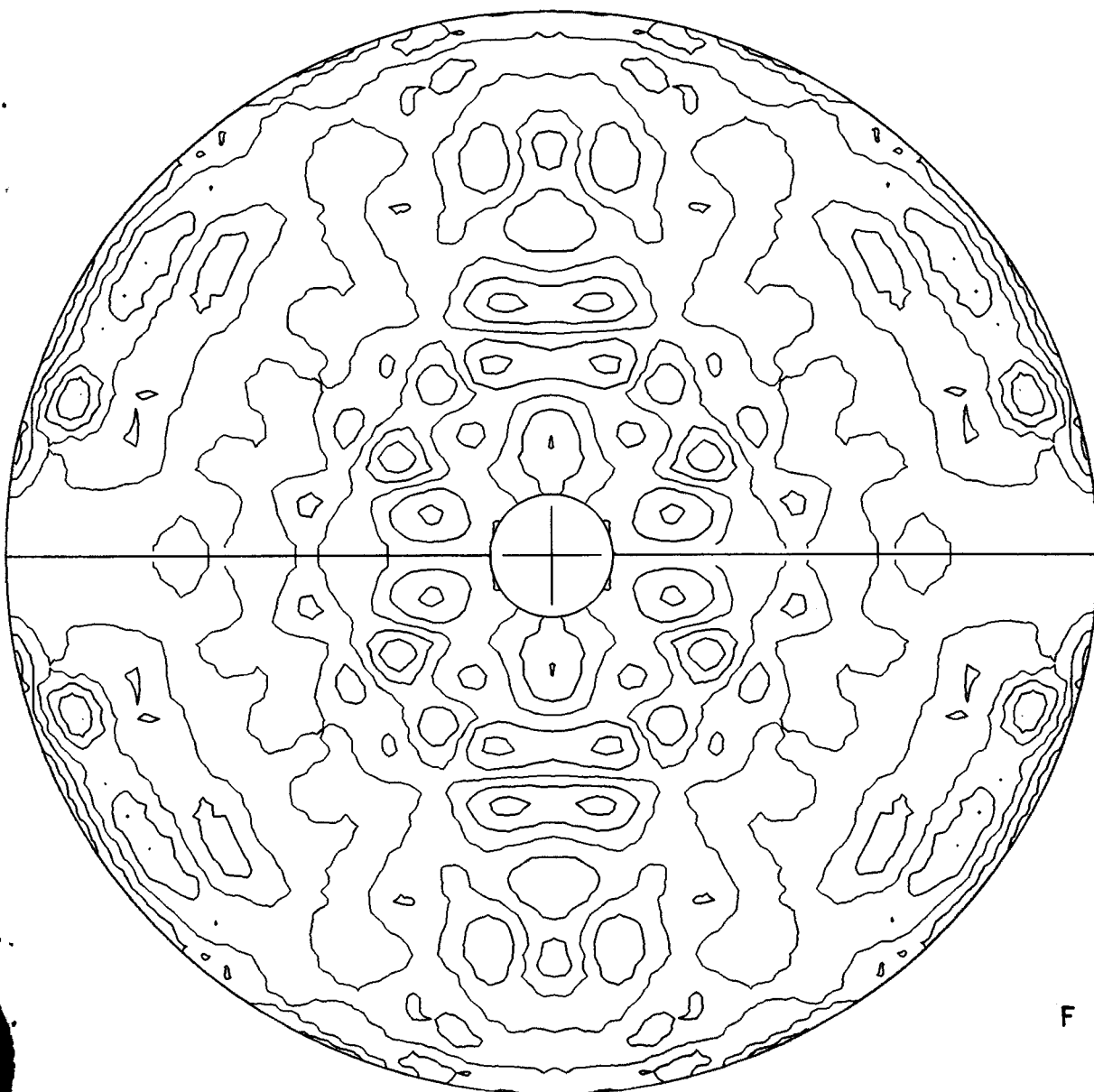


FIGURE 3