ENGINEERING MEMO #115

TO: BOBBY ULICH

FROM: L. J. KING

SUBJECT: IMPROVEMENT OF THE SURFACE ERRORS FOR 36 FT TELESCOPE

IT SEEMS THAT THE REFLECTOR SURFACE ASTIGMATISM CAN NOT BE IMPROVED SIGNIFICANTLY BY CONTROLLING TEMPERATURE OF THE MEMBERS AND/OR BY APPLYING FORCES AT THE STRUCTURAL JOINTS. HOWEVER, I HAVE OBTAINED GOOD RESULTS BY MODIFYING THE BACKUP STRUCTURE, REF. P.2. THE CONTOUR MAP FOR 5 DEGF UNIFORM TEMPERATURE INCREASE FOR THIS MODIFIED STRUCTURE IS PLOTTED ON P.3. THE IMPROVEMENT OF SURFACE THERMAL RMS ERRORS OF THIS MODIFIED STRUCTURE IS AT THE EXPENSE OF THE D.L. DEFLECTIONS WHEN THE REFLECTOR IS AWAY FROM THE REFERENCE ~~ZENITH~~ POSITION. SOME RESULTS OF THE RMS CALCULATIONS ARE GIVEN AS FOLLOWS:

LOADING CONDITION		TEMP LOAD ONLY		TEMP LOAD + D.L. REFL@ 90 WRT 60	
TEMP INCREASE		RMS (IN)	F(NEW) (IN)	RMS (IN)	F(NEW) (IN)
DELT=0F	1	-------	-------	.000596	345.6107
	AZ HALF	-------	-------	.000105	345.6102
	EL HALF	-------	-------	.000705	345.6097
DELT=5F	1	.000349	345.6524	.000730	345.6631
	AZ HALF	.000289	345.6544	.000336	345.6645
	EL HALF	.000333	345.6497	.000797	345.6594
DELT=15F	1	.001048	345.7571	.001272	345.7678
	AZ HALF	.000867	345.7631	.000904	345.7733
	EL HALF	.000998	345.7490	.001256	345.7587

IT IS NECESSARY AT THIS TIME TO VERIFY THE CALCULATIONS BY TAKING SOME STRAIN GAGE READINGS OF THE REFLECTOR STRUCTURE WHICH WE HAVE DISCUSSED OVER THE TELEPHONE ON 3-17-1976. IT WOULD BE GREATLY APPRECIATED IF YOU CAN OBTAIN THE INFORMATIONS AS OUTLINED ON P.4.

CC: G.PERRY
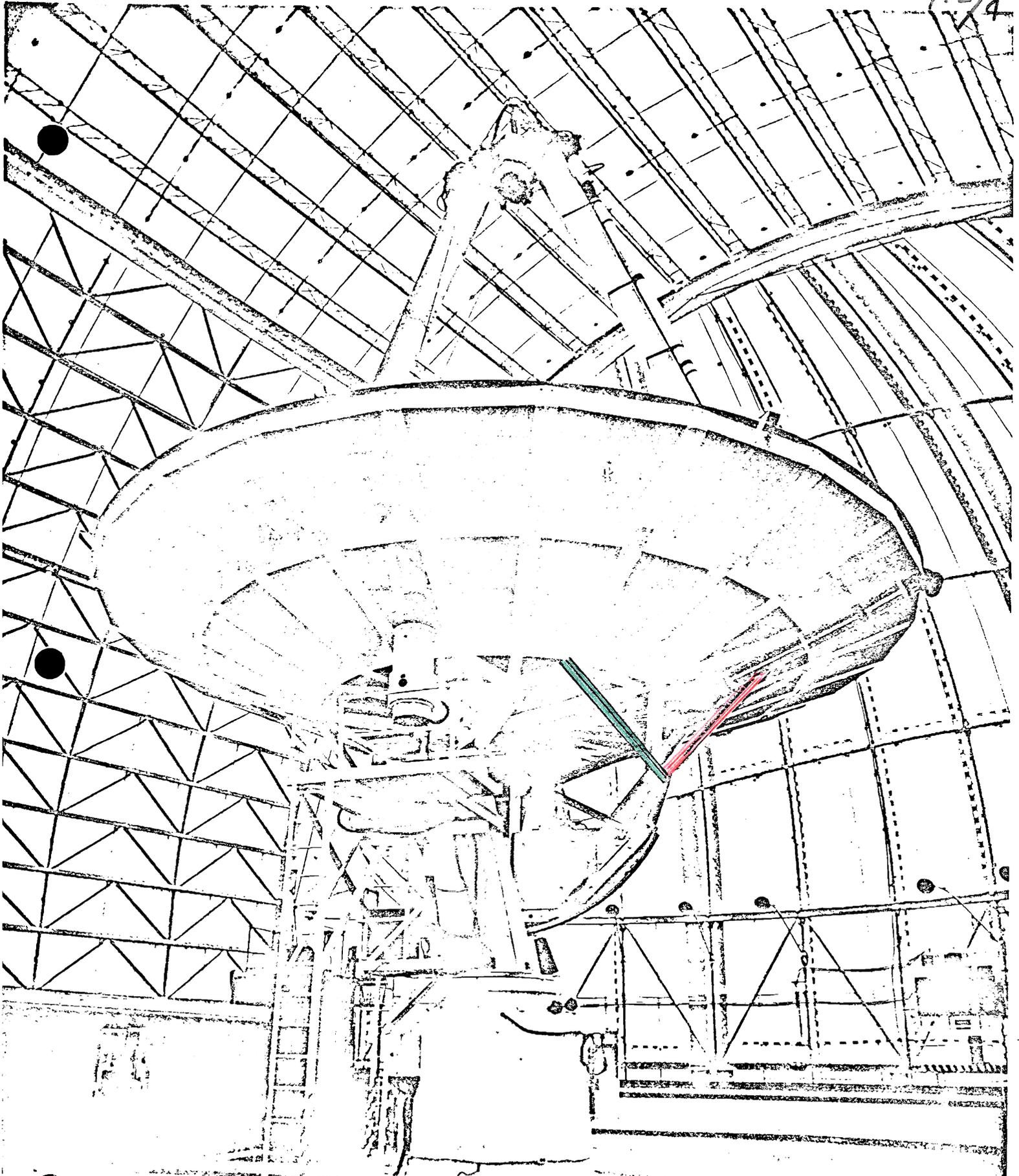
NOTE:

RED MEMBERS (2) ARE REPLACED BY GREEN
— MEMBERS (4) IN THE MODIFIED STRUCTURE
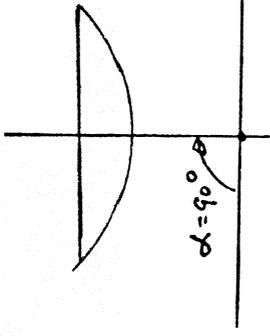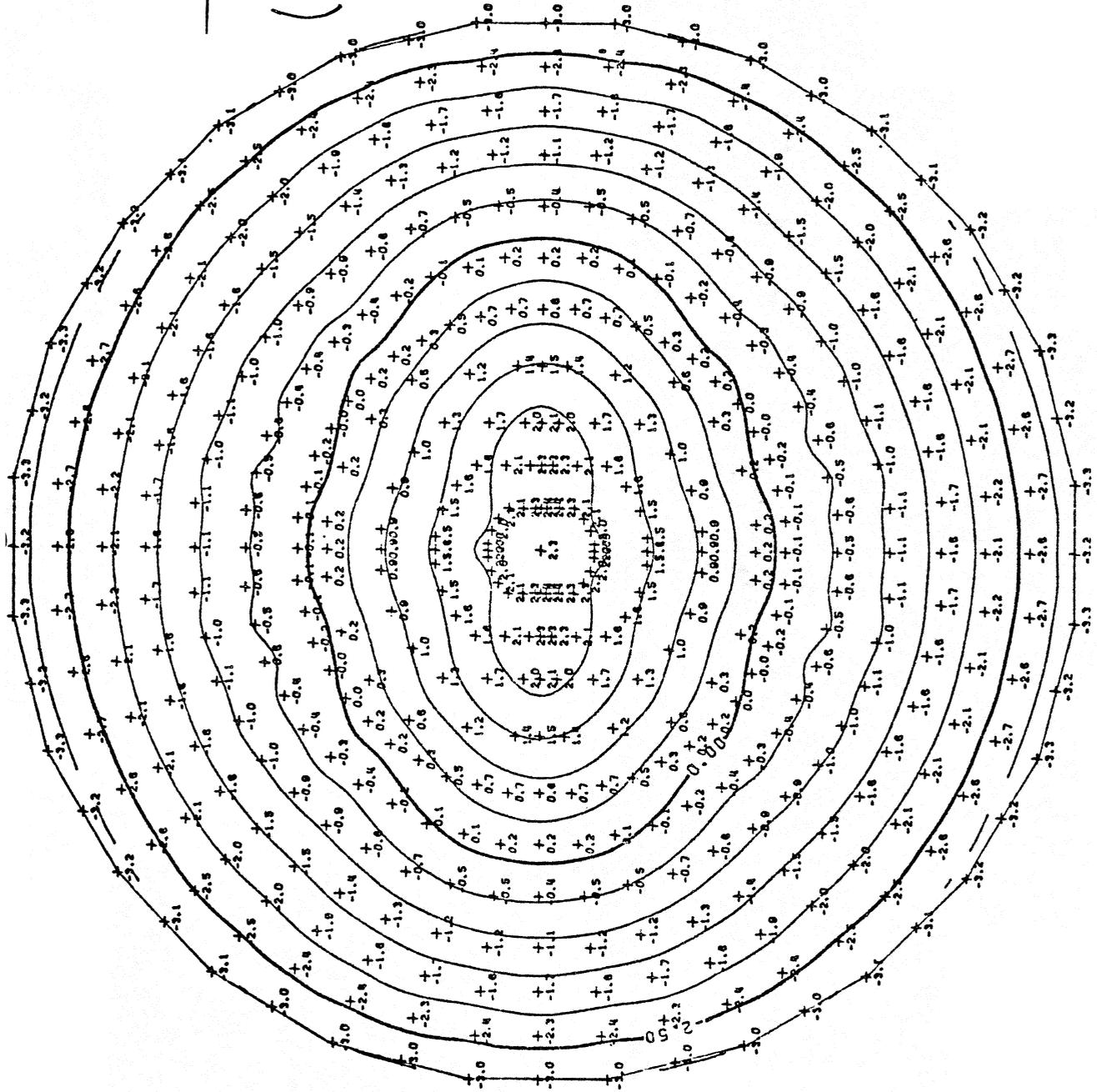
SURF. DEV. --- REFL36YM 5 DEGF (BLEV 0.5X10E-3 IN)

DESIRED LOCATIONS FOR STRAIN GAGES

1) In order to obtain both bending and axial forces in the members,
two strain gages are required for each member. A total of four
gages is needed.

2) The gages shall be located as close to the estreme fibres ((1)
and (2)) of the cross-section as possible at the center of the
members (RED members shown on p. 2)

CROSS-SECTION OF RED MEMBER

∠5 × 3½ × ⅝
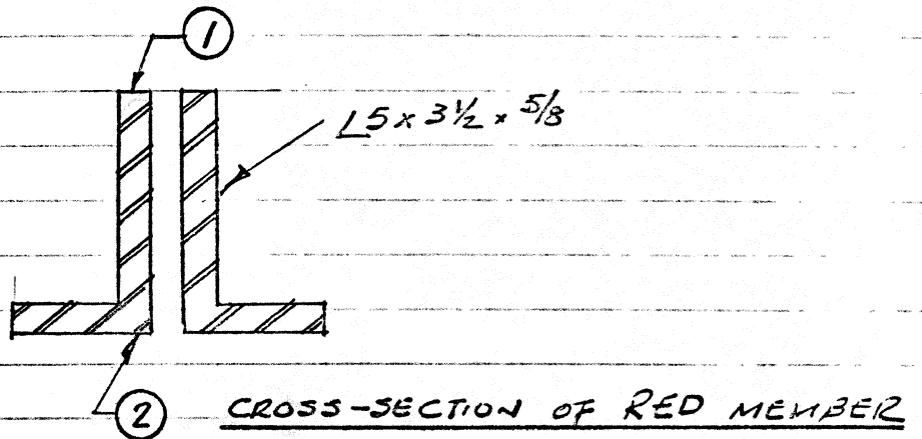
3) Strains vs Elevation angle of the reflector are to be recorded.