

National Radio Astronomy Observatory

Charlottesville, Virginia

5-14-1982

To: W. Horne

From: L. J. King

12 METER MILLIMETER WAVE TELESCOPE

MEMO No. 162

Subject: 12M Template Deflection Analysis

There is a 17.886° angle between the reference jig and the telescope coordinates. In April, J. Findlay asked me to calculate the corrections for the sensor readings for the template rotated from RJ coor. to measure the telescope surface. I have given him the maximum corrections of 21 μ & 15 μ in \parallel & \perp to the sensor axis, resp. based on an earlier design model. This model later was discovered to be too light in weight. The revised corrections are much larger.

The results are tabulated as follows

		①	②	③
		12-7-81 DESIGN MODEL	ANALYSIS RESULT	IMPROVED VERSION
WEIGHT		65.03 #	139.6 #	150 #
MAX. CORREC- TIONS	\parallel	21 μ m	54 μ m	25 μ m
	\perp	15 μ m	16 μ m	10 μ m

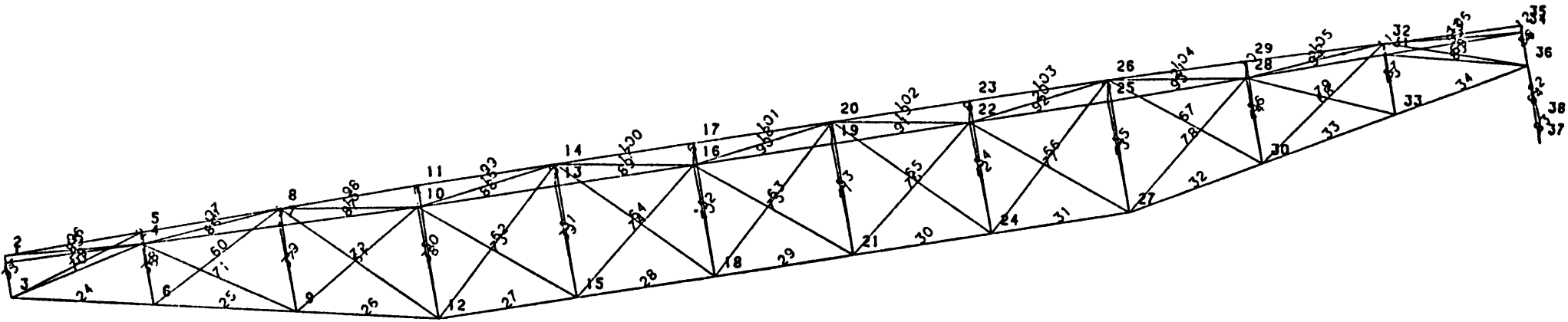
The present template, weighted by B. Peery, is 141# including a 7.37# hold-down lead at the outer end. A weight difference of 6# needs to be resolved for the analytical model used.

The improved version, given in the last column, differed from the present template only by doubling the tubing areas of the members on which the sensors are mounted.

The computer results and models are given on the following pages.

COMPUTER MODEL FOR ①

WT = 65.03 #

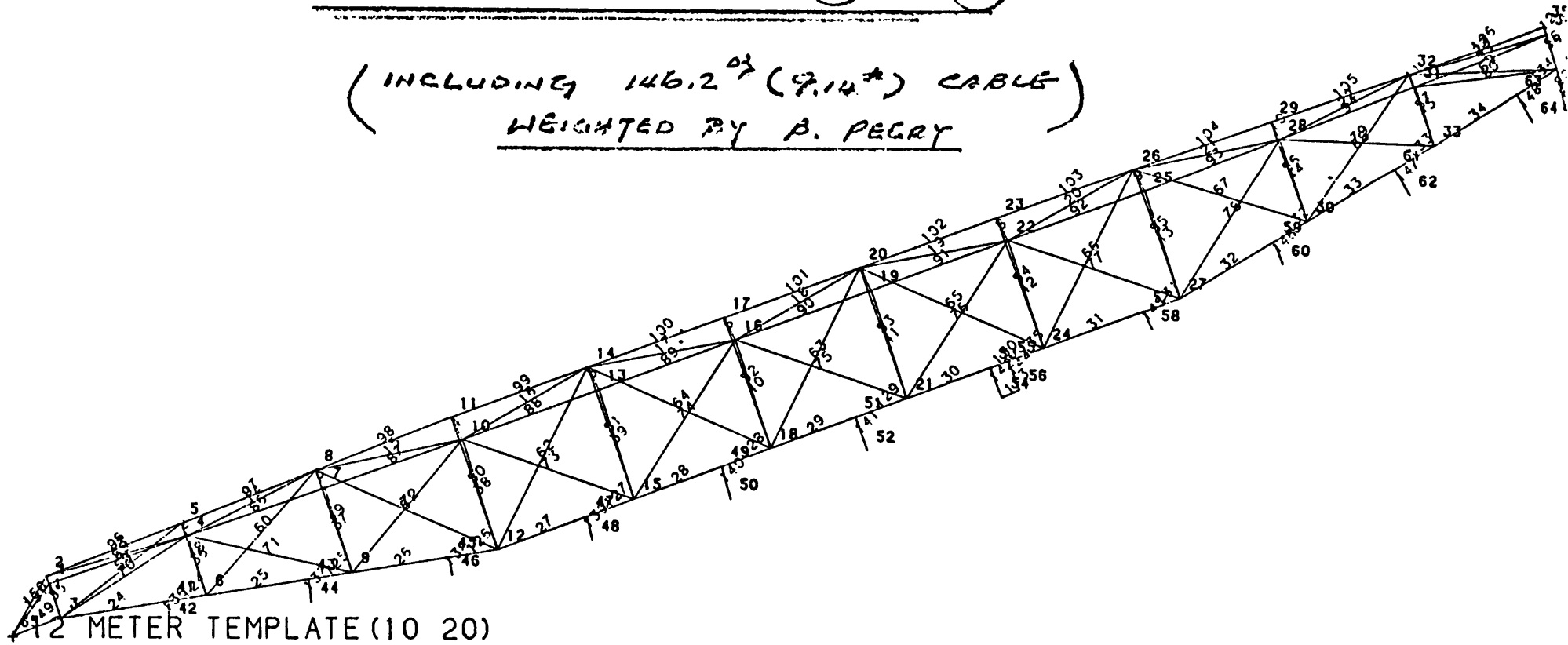


+ 12 METER TEMPLATE (10 20)

+
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COMPUTER MODEL FOR (2) & (3)

(INCLUDING 146.2⁰³ (7.14*) CABLE)
WEIGHTED BY B. PERRY



R.2/5

DEFLECTIONS DUE TO TEMPLATE WEIGHT ROTATED FROM JIG TO REFL POSITIONS

2

I	X	Y	SLOPE	DEFLECTIONS X Y	DEFLS N T (IN.)	(MM)	
42	24.2703	0.7363	3.4722	-0.0002878 0.0011750	-0.00119-0.00022	-0.030 -0.005	1
44	46.0861	2.6549	6.5724	-0.0006065 0.0015899	-0.00165-0.00042	-0.042 -0.011	2
46	67.7677	5.7406	9.6157	-0.0008126 0.0017305	-0.00184-0.00051	-0.047 -0.013	3
48	89.2576	9.9587	12.5791	-0.0010185 0.0019098	-0.00209-0.00058	-0.053 -0.015	4
50	110.5052	15.2643	15.4435	-0.0011693 0.0018985	-0.00214-0.00062	-0.054 -0.016	5
52	131.4676	21.6046	18.1941	-0.0012875 0.0017889	-0.00210-0.00066	-0.053 -0.017	6
54	152.1089	28.9214	20.8204	-0.0013708 0.0015959	-0.00198-0.00071	-0.050 -0.018	7
56	154.8478	29.9723	21.1624	-0.0013508 0.0015437	-0.00193-0.00070	-0.049 -0.018	8
58	175.1852	38.3623	23.6516	-0.0013106 0.0012308	-0.00165-0.00071	-0.042 -0.018	9
60	195.1498	47.6043	26.0066	-0.0013088 0.0009378	-0.00142-0.00077	-0.036 -0.019	10
62	214.7295	57.6360	28.2280	-0.0012011 0.0005342	-0.00104-0.00081	-0.025 -0.020	11
64	233.9181	68.3971	30.3189	-0.0009955-0.0000306	-0.00048-0.00087	-0.012 -0.022	12

DEFLECTIONS DUE TO 25# TOTAL CN JOINTS 16 17 19 20 IN JIG COOR

2

I	X	Y	SLOPE	DEFLECTIONS X Y	DEFLS N T (IN.)	(MM)	
42	24.2703	0.7363	3.4722	0.0003328-0.0037116	0.00372 0.00011	0.095 0.003	1
44	46.0861	2.6549	6.5724	0.0009454-0.0062353	0.00630 0.00023	0.160 0.006	2
46	67.7677	5.7406	9.6157	0.0015824-0.0080703	0.00822 0.00021	0.209 0.005	3
48	89.2576	9.9587	12.5791	0.0022305-0.0094660	0.00972 0.00012	0.247 0.003	4
50	110.5052	15.2643	15.4435	0.0029958-0.0102694	0.01070 0.00015	0.272 0.004	5
52	131.4676	21.6046	18.1941	0.0037122-0.0102354	0.01088 0.00023	0.276 0.008	6
54	152.1089	28.9214	20.8204	0.0041288-0.0093117	0.01017 0.00055	0.258 0.014	7
56	154.8478	29.9723	21.1624	0.0040739-0.0091677	0.01002 0.00049	0.255 0.012	8
58	175.1852	38.3623	23.6516	0.0039893-0.0076211	0.00858 0.00060	0.218 0.015	9
60	195.1498	47.6043	26.0066	0.0035009-0.0057570	0.00671 0.00062	0.170 0.016	10
62	214.7295	57.6360	28.2280	0.0027122-0.0034620	0.00433 0.00075	0.110 0.019	11
64	233.9181	68.3971	30.3189	0.0015062-0.0005308	0.00122 0.00103	0.031 0.026	12

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TEMPLATE DEFLS: FROM JIG TO REFL POSITION (IMPROVED VERSION)

3

I	X	Y	SLOPE	DEFLECTIONS X Y	DEFLS N T (IN.)	(MM)	
42	24.2703	0.7363	3.4722	-0.0001847 0.0005909	-0.00060-0.00015	-0.015 -0.004	1
44	46.0861	2.6549	6.5724	-0.0003384 0.0007339	-0.00077-0.00025	-0.020 -0.006	2
46	67.7677	5.7406	9.6157	-0.0004411 0.0007539	-0.00082-0.00031	-0.021 -0.008	3
48	89.2576	9.9537	12.5791	-0.0005488 0.0008541	-0.00095-0.00035	-0.024 -0.009	4
50	110.5052	15.2643	15.4435	-0.0006296 0.0008582	-0.00099-0.00038	-0.025 -0.010	5
52	131.4676	21.6046	18.1941	-0.0006983 0.0008167	-0.00099-0.00041	-0.025 -0.010	6
54	152.1089	28.9214	20.8204	-0.0007550 0.0007364	-0.00096-0.00044	-0.024 -0.011	7
56	154.8478	29.9723	21.1624	-0.0007458 0.0007120	-0.00093-0.00044	-0.024 -0.011	8
58	175.1852	38.3623	23.6516	-0.0007245 0.0005505	-0.00079-0.00044	-0.020 -0.011	9
60	195.1498	47.6043	26.0066	-0.0007431 0.0004323	-0.00071-0.00048	-0.018 -0.012	10
62	214.7295	57.6360	28.2280	-0.0007024 0.0002474	-0.00055-0.00050	-0.014 -0.013	11
64	233.9181	68.3571	30.3189	-0.0006002-0.0000418	-0.00027-0.00054	-0.007 -0.014	12

TEMPLATE DEFLS: 25# TOTAL CN 16 17 19 20 IN JIG CCCR (IMPROVED VERSION)

3

I	X	Y	SLOPE	DEFLECTIONS X Y	DEFLS N T (IN.)	(MM)	
42	24.2703	0.7363	3.4722	0.0001947-0.0024393	0.00245 0.00005	0.062 0.001	1
44	46.0861	2.6549	6.5724	0.0005562-0.0041483	0.00418 0.00008	0.106 0.002	2
46	67.7677	5.7406	9.6157	0.0009401-0.0053970	0.00548 0.00003	0.139 0.001	3
48	89.2576	9.9537	12.5791	0.0013243-0.0063877	0.00652-0.00010	0.166 -0.003	4
50	110.5052	15.2643	15.4435	0.0017899-0.0070025	0.00723-0.00014	0.184 -0.004	5
52	131.4676	21.6046	18.1941	0.0022159-0.0070225	0.00736-0.00009	0.187 -0.002	6
54	152.1089	28.9214	20.8204	0.0024241-0.0064016	0.00685-0.00001	0.174 -0.000	7
56	154.8478	29.9723	21.1624	0.0023848-0.0062987	0.00673-0.00005	0.171 -0.001	8
58	175.1852	38.3623	23.6516	0.0022454-0.0052340	0.00570-0.00004	0.145 -0.001	9
60	195.1498	47.6043	26.0066	0.0018604-0.0039905	0.00440-0.00009	0.112 -0.002	10
62	214.7295	57.6360	28.2280	0.0013006-0.0024603	0.00278-0.00002	0.071 -0.000	11
64	233.9181	68.3571	30.3189	0.0004434-0.0005075	0.00066 0.00013	0.017 0.003	12

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