

Fermilab

RANDOLITE COMPRESSION TEST

M. T. Mruzek  
July 16, 1980

Purpose: The purpose of this experiment is to verify the compression post assembly can withstand a load of 300,000 lbs.

Results:

1. The compression post can withstand a load of 300,000 lbs. This corresponds to a stress of 75,500 psi, and a safety factor of approximately four.
2. Skewing the assembly does not affect its ability to withstand 300,000 lbs.
3. The effective elastic modulus of the entire assembly in the vertical position at LN<sub>2</sub> temperatures is  $4.85 \times 10^6$  psi.

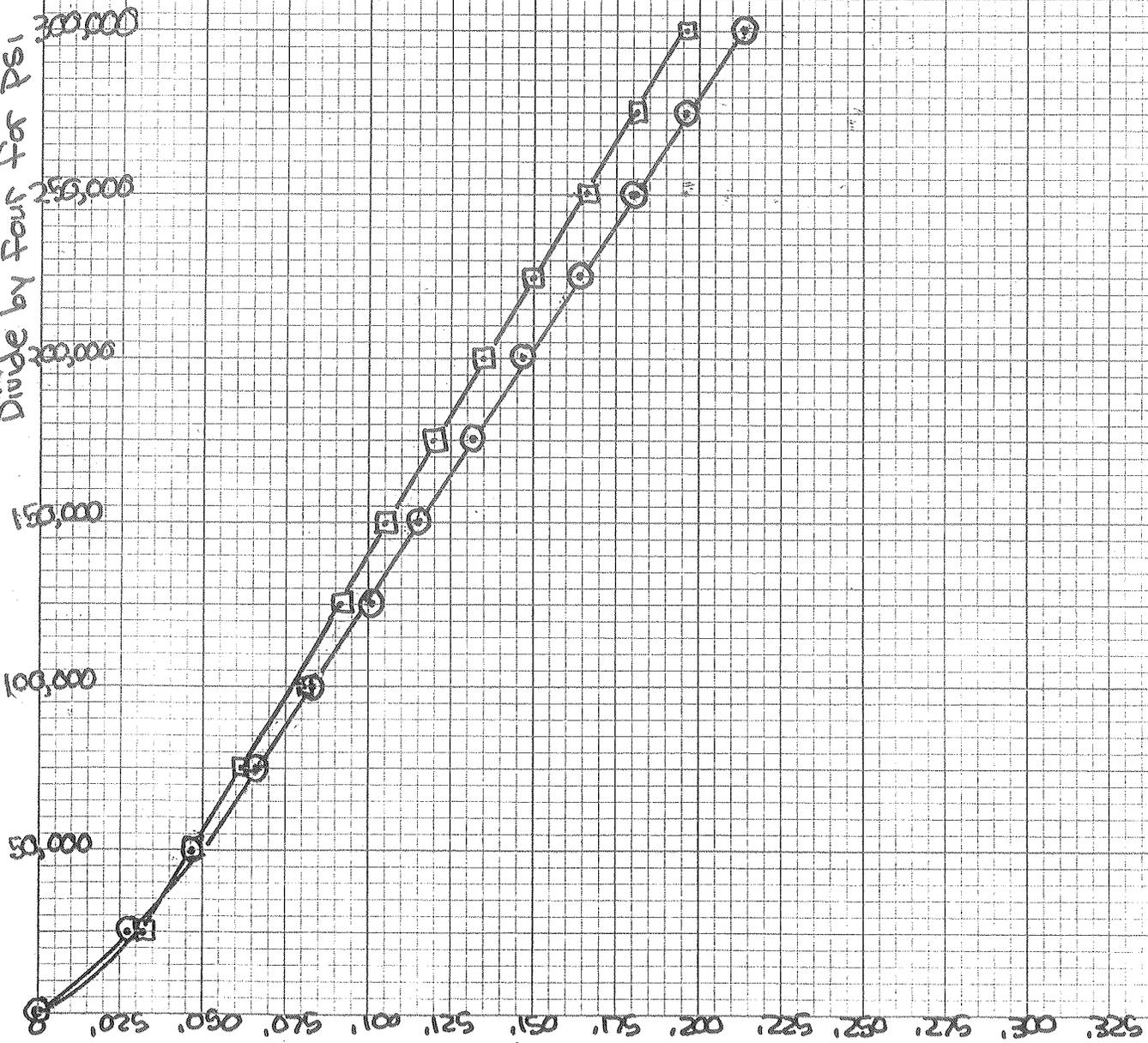
# Randblite Support Compression Test

⊙ Specimen tested at LN<sub>2</sub> temps.  
Post was vertical.

⊠ Specimen tested at LN<sub>2</sub> temps.  
Post was skewed 1/4".

M.T. Mruzek  
7/16/80  
Pittsburgh Testing

Load (lbF)  
Divide by four for Psi



Deflection (inches)

Procedure for Compression Post Test

1. Assemble Post and Aluminum pieces. Overall length = 12.75", Rod dia =  $2\frac{1}{4}$ ", Material is Randolite. Assembly detailed in Drawing by R. Carra for Research Services.
2. Tape Assembly together using Mylar tape.
3. Immerse assembly in Liquid Nitrogen and allow it to come to equilibrium.
4. Install deflection measurement apparatus.
5. Take post loading up and measure incremental deflections. Post should be tested perpendicularly. Specimen should take load up to 300,000 lbs.
6. Back off on load and reimmerse post in LN<sub>2</sub>.
7. Use angle guide to re-install post at predetermined slant of  $\frac{1}{4}$ ".
8. Load up assembly post to 300,000 lbf.

Test Run 1 and 2  
Material Randolite  
Temp LN<sub>2</sub>

Orientation I → perp  
H → slanted

Force	I Deflection	H Deflection
0	0	0
25,000	.027	.031
50,000	.047	.047
75,000	.066	.062
100,000	.0825	.076
125,000	.101	.091
150,000	.115	.105
175,000	.132	.120
200,000	.147	.135
225,000	.164	.150
250,000	.180	.166
275,000	.196	.181
300,000	.214	.197

Purpose: The purpose of this expt. is to verify the compression post assembly can withstand a load of 300,000 lbf.

### Results

1. The compression post can withstand a load of 300,000 lb. This corresponds to a stress of 75,500 psi, and a safety factor of approximately four.
2. Skewing the assembly does not affect its ability to withstand 300,000 lb.
3. The effective elastic modulus of the entire assembly in the vertical position at LN<sub>2</sub> temperatures is  $4.85 \times 10^6$  psi.

Michael S Mrowdzek  
7/16/80

FOUND AND ENTERED INTO PERMANENT FILE 3/3/87

TYPED VERSION PRESENTLY IN FILE HAS NO

SKETCH OR REAL DESCRIPTION OF EXPERIMENTAL

APPARATUS. SKETCH IS INCLUDED HERE.

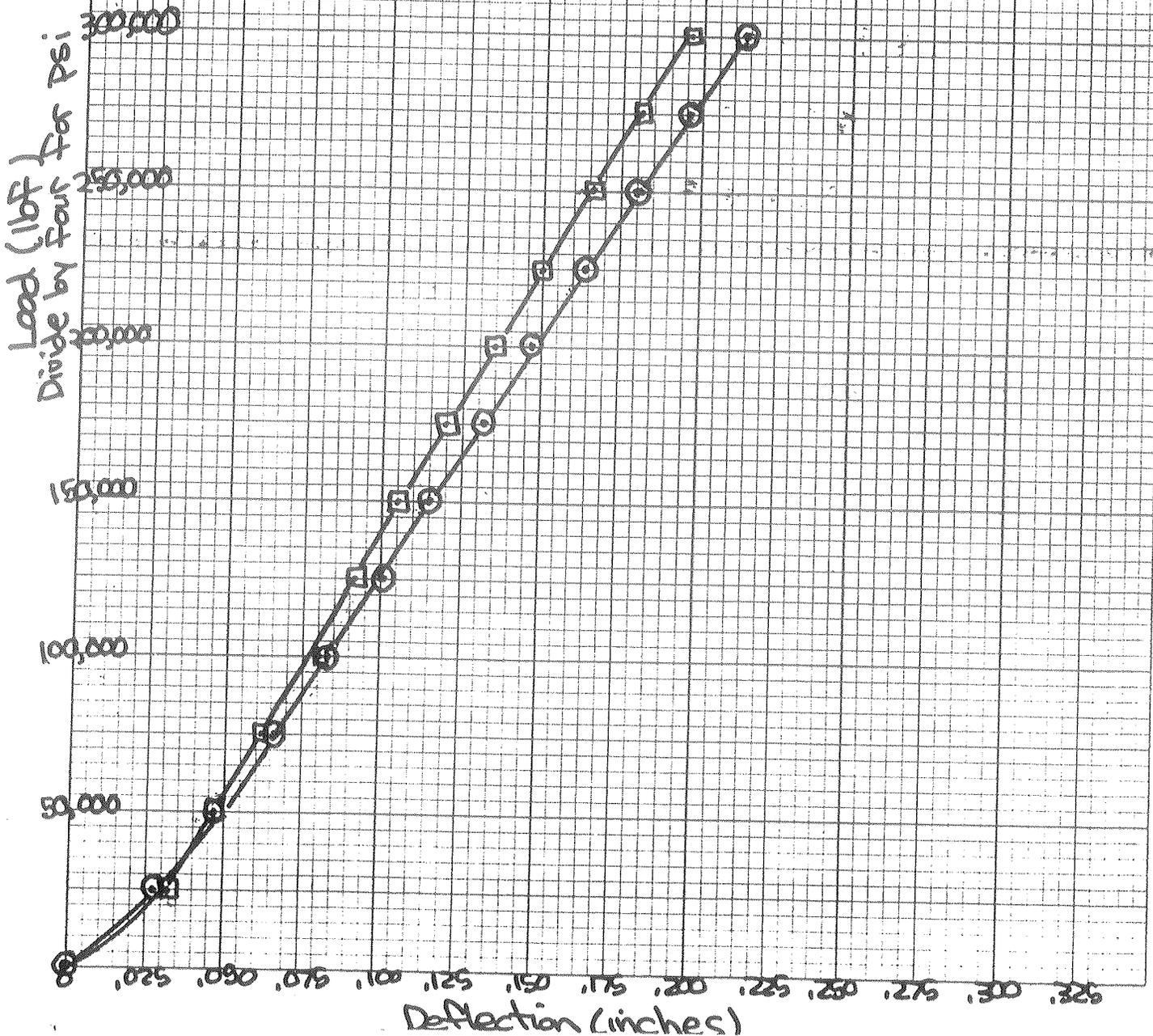
J. P. Kelly  
3/3/87

# Randolite Support Compression Test

⊙ Specimen tested at LN<sub>2</sub> temps.  
Posted was vertical

⊠ Specimen tested at LN<sub>2</sub> temps.  
Post was skewed 1/4"

M.T. Muzek  
7/16/80  
Pittsburgh Testing



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M. S. ...  
7/16/80

## Procedure for Compression Post Test

1. Assemble Post and Aluminum pieces, overall length = 12.75", Rod dia = 2 1/4", Material is Bandedite. Assembly detailed in Drawing by R. Corra for RLS.
2. Tape Assembly together using Mylar tape.
3. Immerse assembly in Liquid Nitrogen and allow it to come to equilibrium.
4. Install deflection measurement apparatus.
5. Take post loading up and measure incremental deflections. Post should be tested perpendicularly. Specimen should take load up to 300,000 lbs.
6. Back off on load and reimmerse post in LN<sub>2</sub>.
7. Use angle guide to re-install post at predetermined slant of 1/4".
8. Load up assembly post to 300,000 lbs.

Name MIT. Mruzek  
Date 7/16/80

Test Run 1 and 2  
Material Randolite  
Temp LN<sub>2</sub>

Orientation I → perp.  
I → slanted

Face	I Deflection	Deflection I
0	0	0
25,000	.027	.031
50,000	.047	.047
75,000	.066	.062
100,000	.0825	.076
125,000	.101	.091
150,000	.115	.105
175,000	.132	.120
200,000	.147	.135
225,000	.164	.150
250,000	.180	.166
275,000	.196	.181
300,000	.214	.197

# Sketch of Test in Progress

Crosshatching depicts frosted areas

