

SILICON RIBBON STRESS/STRAIN WORKSHOP

MOBIL SOLAR ENERGY CORP.

M. H. Leipold

Program Relevance of Workshop

Provide generic understanding of the sources of stress, deformation and structural characteristics occurring during the growth of silicon ribbon

Technical value:

Encourage interaction among researchers studying sources and effects of deformation and structure during growth of silicon ribbon

Previous meetings:

**November 8-9, 1983, Mobil Solar Energy Corp.
January 10-10, 1984 Westinghouse Electric Corp.**

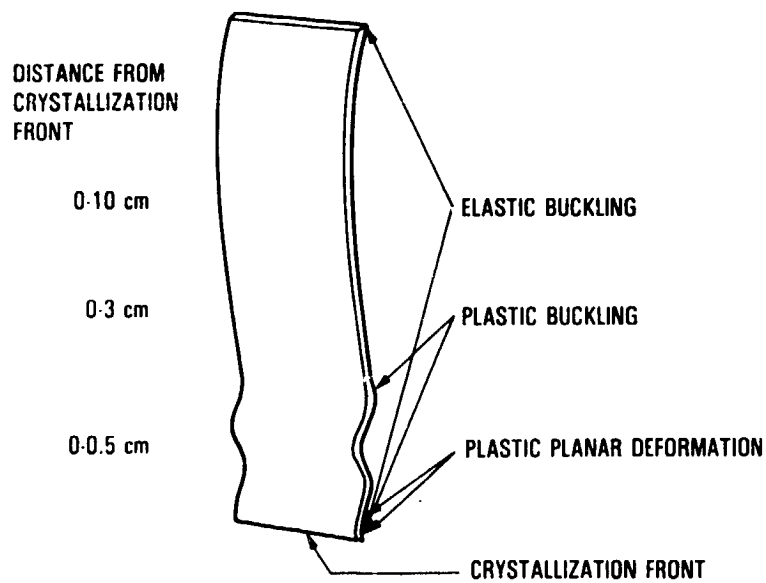
Wednesday 23, January 1985

8:30 AM	Opening	- M. Leipold
8:45	Stress/Strain Modeling	- O. Dillon, University of Kentucky
9:30	Defect Mapping in Silicon Sheet	- R. De Angelis, University of Kentucky
10:15	Coffee break	
10:30	Failure Analysis of Silicon Sheet	- T. O'Donnell, JPL
11:15	Silicon Materials Tests	- W. Phillips, JPL
12:00 Noon	Lunch	
2:00	Stress/Strain Analysis Program	- R. Seidensticker, Westinghouse
2:45	Coffee break	
3:00	Lateral Temperature Modeling of Web	- R. Sekerka, Carnegie-Mellon Institute
3:45	Plastic Deformation in Web Material	- L. Cheng, JPL

Thursday 24, January 1985

8:45 AM	Stress/Strain Analysis	- J. Kalejs, Mobil Solar
9:30	Heat Flow Model	- R. Brown, MIT
10:15	JPL Stress/Strain Program	- B. Wada, JPL
12:00 Noon	Lunch	
1:00	Discussion on Future Research Activities	
2:30	Wrap-up Discussion by DOE, SERI, JPL	

ADVANCED SILICON SHEET



Elastic Buckling

- Analytical method generally available
- Limitations
 - Thermal profile
 - Elastic properties
 - Specific buckling mode not easily predictable
- Reasonable agreement
 - Theory — experiment
 - Various analytical approaches

Plastic Buckling

- Analytical development proceeding
- Limitations
 - Range of analysis limited
 - Availability of mechanical data for Si
 - Thermal profile
- Agreement
 - Experimental confirmation not available

Plastic In-Plane Deformation

- Analytical development proceeding
- Limitations
 - Thermal profile very poorly known
 - Limited distance
 - Mechanical work
 - Availability of data for Si
- Agreement
 - Basically none

Summary

- Progress continues for models to describe mechanical aspects of ribbon growth, but answer not yet at hand
- Comparison and integration of various approaches under way
- Experimental confirmation of many elements not yet begun