

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

#93-5

HAYSTACK OBSERVATORY

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To: Holographers  
From: Alan E.E. Rogers *AEEOR*  
Subject: Do the Haystack panels act as a uniform shell?

Mehdi Zarghamee has pointed out that the Haystack panels are drawn together (with preload cables) to form a shell. Consequently, Mehdi feels that a temperature difference between front and back surfaces of the panels should not result in any surface deformation, at least not with the magnitude of  $L^2\delta/(8t)$  where  $L$  is the distance across the panel, as I suggested in my memo of 15 April 1993. In my analysis (not given in detail in the memo of 15 April 1993) I modelled the panel junctions as hinges which provided little, if any, constraint to bending in the transverse direction.

Bending moments between panels can only be transferred at the expanders (I assume that the shear blocks are too loose to do very much) which push against the panel edges for a distance of about 1 inch every 24 inches. Upon bending, local concentrated strain will build around the expanders making the panel about 20 times more compliant for a distance of several inches away from the expander. In addition, the expanders themselves have less bending stiffness than the panel owing to their small size in relation to their spacing. The cables tend to add to the bending stiffness and I have to account for this, but think that the effect is small.

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