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6.5-m MMT Mirror Support Load Spreader Gluing:

Summary of Problems, Investigations and Solutions

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1 Requirements and Specifications

The MMT and Magellan 6.5-m honeycomb mirrors are supported in their polishing and telescope cells on a set of metal "load spreader" frames which provide the attachment points for the support actuators and distribute the support forces in an optimum way to the mirror's honeycomb structure. These load spreader frames carry the "puck" support pads which are glued to the glass surface of the mirror backplate. The full complement of load spreaders for these mirrors consists of 68 three-puck and 24 two-puck devices. In addition there are 12 actuators with single on-axis pucks. The latter are distributed primarily near the top and bottom of the outer edge of the mirror backplate.

The glue layer performs two main functions:

1. It firmly adheres the puck to the glass under the combined axial and lateral support loads during operation, handling and transport.
2. It acts as a cushioning layer under the metal load spreader frames and pucks to absorb and isolate unwanted extraneous strains and moments from the glass structure resulting from thermal mismatch, load spreader deflections, and off-center support loads.

In operation the maximum loading on the glue layer occurs as a combined shear and small axial pull when the mirror is horizon-pointing. In this position it is supported by bolts in the load spreader corners engaged in the rubber static supports. The glue layer is required to have an adhesive (surface interface) and a cohesive (bulk material) strength that exceeds these operational stresses by an adequate margin of safety. The design maximum shear force per puck is 187 lbs ($2500/3 = 833$ N). This load is applied ~ 75 mm above the glass surface. The resultant moment can thus generate a small axial tension on the glue joint of 37 lbs ($3"/15" \times 833 = 167$ N).