

Re: Kudos to Musgrave

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From: Christopher M. Jones (*christopher.m.jones_at_gmail.com*)

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Henry Spencer wrote:

- > *Correct. Everyone assumed the RCC was durable enough to take an impact;*
- > *the concern was with the tiles on the underside.*

Yup. I believe the key problem was that the Shuttle engineers assumed that the RCC responded somewhat similarly to the tiles to impact. And they did not perform adequate tests on just the RCC alone to determine what the response actually was. Unfortunately, the RCC is a much different beast than the tiles and it responded much differently.

The engineers knew full well that the tiles were damaged to some degree (though the tile system responds pretty well to that) and were leery about excess heating during reentry (and resultant materials damage and softening). Though they knew that it was unlikely to be too terribly severe, which it wasn't. What they did not anticipate, and did not know, was that an RCC support could be damaged in such a way that it could fail catastrophically under the stress of reentry. When this happened on Columbia it opened up the leading edge of the wing and brought about a cascade of failure in the wing that would eventually result in complete failure of the wing, the thermal protective systems on that side of the vehicle, and eventually loss of vehicle and crew.