

Originally posted by kyra:

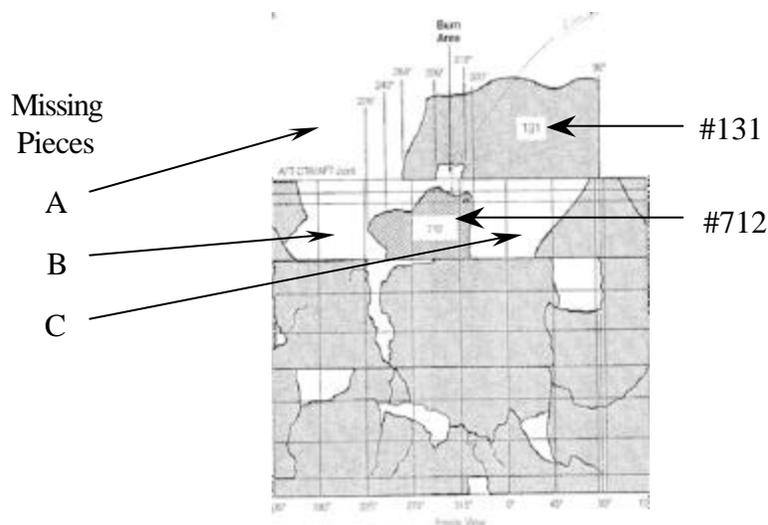
Can this be timed to the classic launch video where the cameras temporarily lose focus for a second or so?

This is the first time in 21 years someone makes direct connection between the NSB photo events and the focus loss in the TV-feed video. Many people discussed the loss of focus in the continuous coverage on the day of the accident and afterwards. There is correlation, but one must first gather all relevant data.

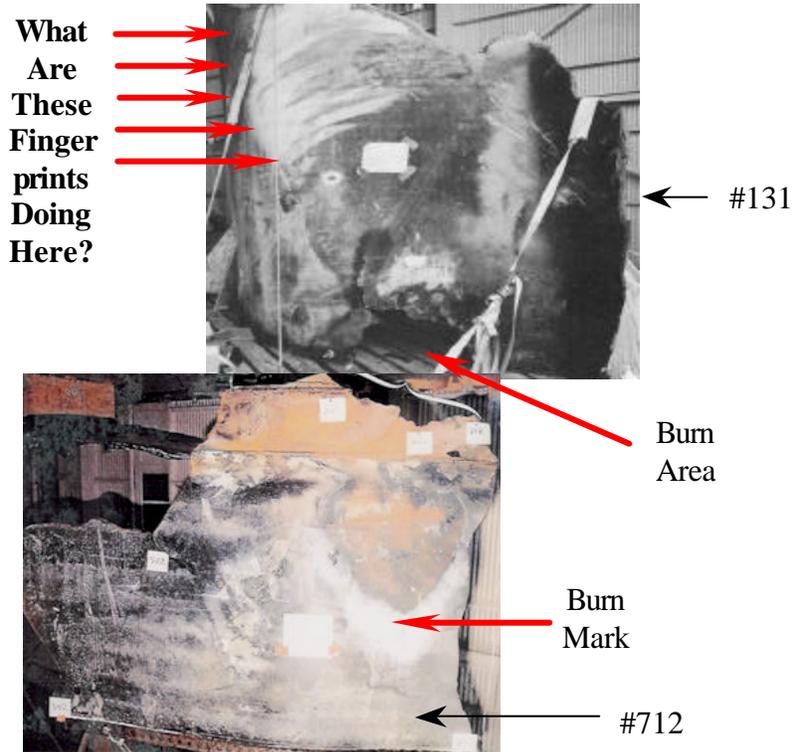
The flight open loop control system pitches the assembly down if it is moving slowly, and up, if it is moving fast. The 10-deg pitch-up observed in the NSB photos at T+40 seconds would have followed a period of unanticipated acceleration. The excess speed would be the result of faster-burn rate of propellant in the breached right aft segments. Afterwards, the intensity of the right booster's plume diminished noticeably, which would cause Challenger to slow down. Other photo evidence, discussed below, points to the possibility that initially Challenger slowed down, before speeding up. Why the emphasis on photo evidence? The black smoke that appeared at lift-off indicated an early failure of some sort. Afterwards, there were communication dropouts. The black smoke was in the vicinity of the cable tray in the RSRB aft segments. The data collected in Mission Control could have been corrupted.

The out-of-focus in the far field is similar, though not identical, to near-field focusing. We all experienced it with slight up or down movement of a sample under a microscope. The far-field focusing is not as severe. As the vehicle moves farther away, the focus-field narrows down, and the out-of-focus problem becomes more prominent if the system speeds up or slows down. There is correlation between the defocusing in the TV-feed and the events captured in the New Smyrna Beach – and other – photographic evidence. Some evidence comes from the official reports.

The drawing here (Commission, Vol. I, p. 68) shows the “burn area” between pieces #131 (aft center segment piece) and #712 (aft segment piece). Notice the missing pieces that were not recovered in the extensive search: A, B and C. The location of pieces A and B is consistent with the T+54s puff(s) described in my last post.



Now, look at the photos of pieces #131 and #712 (Vol. I, p. 79 and Vol. III, p. O-289). Here, I inverted #712 and positioned it such that the “burn area,” or burn hole, is aligned. The horizontal dimension of the “burn area” was reported at about 27-inches, this is the area I said a few dollars worth of quarters can be placed in it. The existence of this “burn area” shows that the membrane theory – which requires the booster to burst instantly if a hole bigger than 1-inch



developed – is wrong. Study the photos carefully and compare them with the above reconstruction Drawing.

We all know that after T+60 seconds, fire was flowing out of the “burn area” and washed down by the wind as Challenger moved above Mach 1. The oval scorched area (Burn Mark) in the lower piece #712 in the aft segment was noted and discussed in the official reports. That was easy to explain; the wind washed the fire down and the fire left the “Burn Mark.”

Now look at the aft center segment piece #131. Do you see the finger-like scorch marks “above” the burn hole – and my words, “WHAT ARE THESE FINGERPRINTS DOING HERE”? When were these burn marks made? What do they prove or disprove? If Columbo saw these obvious fingerprints, or “handprint,” he wouldn’t leave the hanger before developing an explanation.

The “handprint” represents welder torch-like mini-rocket sending exhaust straight up, which would have altered the motion of Challenger. Notice the footprint of the “in-flight twang” that I mentioned in my last posts. The torch-like fire surged up at the twang’s natural frequency. The “fingers” can be counted and if the time is established, then the frequency can be determined, empirically. The scorch-marks also show when the “aft field joint” failed through the O-rings! Who should have discovered these and related things?

Senior NASA experts with more than 200 years of experience with the design of SRB field joints and the Space Shuttle were driven out of the investigation and the agency after the accident. Who was left to answer the above questions? Thiokol engineers, including, Dr. McDonald.

The Challenger aft field joint, and its primary and secondary O-rings, did not fail at lift-off, and the joint was intact after the vehicle cleared the tower. How do we know this? It's right there – in the combined picture I show above. When you're driving 100 mph and you put your hand out the window, you know which way the wind is blowing. This one needs more aerodynamics. If McDonald and Hansen have an explanation for the torch marks "above the burn hole" in the aft-center piece #131, they can post their explanation here. And if Mr. Henry Spencer solved this one before, he can also post his solution. It's tedious work, but it can be done, and the NASA Challenger films in the Archives are helpful. I need a long post to do it, and I'll skip it for now.

2-D or 3-D? Don't expect stereoscopic views or holograms. For the New Smyrna Beach's distant plumes, I wrapped pieces of paper, taped them together, and with physicists and engineers, including a former senior Shuttle engineer, we used flood lights to simulate the lighting of the Sun and the plumes to make sure that the puffs were actually puffs and the extra trail at the end of flight was an extra trail. For the above burn marks, I used my Shuttle models. I also wrapped white cardboard pieces into cylindrical shapes, cut out the burn area and the missing pieces, marked the "fingerprints" and simulated the motions of Challenger to develop clear explanations for the inexplicable burn marks. The best 3-D models were simple white Styrofoam coffee cups, which I used in my course, Anatomy of Failure Mechanisms, and when the cups were ruined, someone ran to the coffee station and brought more.

The focusing trouble in the TV-feed can be correlated (qualitatively) with the photo evidence. It is better to gather all relevant facts first. *"One thing at a time."*

Ali