

In the reports, *every single text-slide* uses bullet-outlines with 4 to 6 levels of hierarchy. Then another multi-level list, another bureaucracy of bullets, *starts afresh* for a new slide. How is it that each elaborate architecture of thought always fits *exactly* on one slide? The rigid slide-by-slide hierarchies, indifferent to content, slice and dice the evidence into arbitrary compartments, producing an anti-narrative with choppy continuity. Medieval in its preoccupation with hierarchical distinctions, the PowerPoint format signals every bullet's status in 4 or 5 different simultaneous ways: by the order in sequence, extent of indent, size of bullet, style of bullet, and size of type associated with various bullets. This is a lot of insecure format for a simple engineering problem.

The format reflects a common conceptual error in analytic design: information architectures mimic the hierarchical structure of large bureaucracies pitching the information. Conway's Law again. In their report, the Columbia Accident Investigation Board found that the distinctive cognitive style of PowerPoint reinforced the hierarchical filtering and biases of the NASA bureaucracy during the crucial period when the Columbia was damaged but still functioning:

The Mission Management Team Chair's position in the hierarchy governed what information she would or would not receive. Information was lost as it traveled up the hierarchy. A demoralized Debris Assessment Team did not include a slide about the need for better imagery in their presentation to the Mission Evaluation Room. Their presentation included the Crater analysis, which they reported as incomplete and uncertain. However, the Mission Evaluation Room manager perceived the Boeing analysis as rigorous and quantitative. The choice of headings, arrangement of information, and size of bullets on the key chart served to highlight what management already believed. The uncertainties and assumptions that signaled danger dropped out of the information chain when the Mission Evaluation Room manager condensed the Debris Assessment Team's formal presentation to an informal verbal brief at the Mission Management Team meeting.<sup>9</sup>

At the same time, lower-level NASA engineers were writing about the possible dangers to the Columbia in several hundred emails, with the Boeing reports in PP format sometimes attached. The text of about 90% of these emails simply used *sentences* sequentially ordered into *paragraphs*; 10% used bullet lists with 2 or 3 levels. These engineers were able to reason about the issues without employing the baroque hierarchical outlines of the original PP pitches. Good for them.

Several of these emails referred to the 3 PP reports as the "Boeing PowerPoint Pitch." The WhatPoint Pitch? The PowerWhat Pitch? The PowerPoint What? *The language, attitude, and presentation tool of the pitch culture had penetrated throughout the NASA organization, even into the most serious technical analysis, the survival of the shuttle.*

<sup>9</sup> Columbia Accident Investigation Board, *Report*, volume 1 (August 2003), 201.

