Rethinking the Design of Presentation Slides

Presentations on Slide Design
Penn State, 2007 (pdf)
USGS, 2005 (wmv)
Virginia Tech, 2004 (pdf)

Criticism of PowerPoint
Jaffe, *Wall Street Journal*
Keller, *Chicago Tribune*
Parker, *New Yorker*
Schwartz, *New York Times*
Tufte, *Wired*

Research on Slide Design
FIE (October 2005)
Tech Comm (February 2005)
Tech Comm (November 2005)
Tech Comm (May 2006)

Resources and Templates
Teaching Slide Design
PowerPoint Template

Recently, much criticism has arisen about the design of slides created with Microsoft PowerPoint. This web page challenges PowerPoint's default design of a single word or short phrase headline supported by a bullet list. Rather than subscribing to Microsoft's topic-subtopic design for slides, this web page advocates an assertion-evidence design, which serves presentations that have the purpose of informing and persuading audiences about technical content. This design, which features a sentence-assertion headline supported by visual evidence, is documented in Chapter 4 of *The Craft of Scientific Presentations*, a November 2005 article in *Technical Communication,* and the presentation "Rethinking the Design of Presentation Slides."

Three key assumptions exist for using this assertion-evidence design. The first is that slides are an appropriate visual aid for the presentation (too often, slides are projected when no visual aid would better serve the presentation). Second, the success of the presentation hangs on the audience understanding the content. Finally, the primary purpose of the slides is to help the audience understand the content, rather than to provide talking points for the speaker.

For a number of years, others have advocated an assertion-evidence slide design for engineering and scientific presentations. These advocates include Larry Gottlieb (Lawrence Livermore National Lab), Hugh Keedy (Vanderbilt), Bob Leedom (Northrop Grumman), Jean-luc Doumont (Principiæ), and Cliff Atkinson (Sociable Media). In addition, instructors such as Rick Gilbert and his team of trainers at PowerSpeaking, Inc., have recently started teaching this slide design. To make it easier for you to adopt this design, this web page provides a special PowerPoint template that you can download to your computer and modify to communicate your content to your audience. Also, to provide you with models, this web-page presents several professional examples, given below, that follow this design.

Assertion-Evidence Slides: Students
Penn State (Atamturkur)
University of Oslo (Aspmo)
Clemson University (Fishel)
University of Illinois (Dibbern)
Los Alamos Dynamics School (Simmers)
Virginia Tech (Lynch)

Assertion-Evidence Slides: Professionals
Sikorsky Aircraft (Stelzer)
Army Research Laboratory (Rochester)
Norwegian Institute for Air Research (Laupsa)
Scandpower Petroleum Technology (Holmås)
United States Geological Survey (Bekins)
Simula Research Laboratory (Bruaset)

Each year, more than 250 million copies of Microsoft PowerPoint produce trillions of presentation slides worldwide [Doumont, 2005]. Many of these presentation slides, which can be overhead transparencies or computer projections, are created by presenters in science and engineering. Because presentation slides reduce the personal connections between the presenter and audience, presenters have to be critical thinkers about when this medium is appropriate and when it is not [Alley, 2003]. Despite this decrease in personal connection, slides are still valuable in scientific and technical presentations, especially when the audience needs to see images or visual relationships to understand the content.

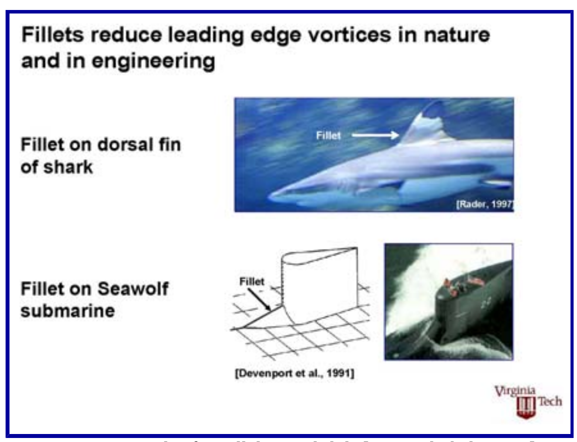


Figure 1. Example of a well designed slide [Zess and Thole, 2001].

Because of its dominant 95 percent of market share [Parker, 2001], Microsoft PowerPoint and its defaults have greatly affected the design of these presentation slides. For that reason, most slides that are shown in science and engineering presentations have short phrase headlines supported either by bullet lists or by bullet lists and images. In essence, this design calls for a topic-subtopic view of the content. Recently, harsh criticism of this design of presentation slides has surfaced in several popular publications: Schwartz, "The Level of Discourse Continues to Slide," *New York Times*; Parker, "Absolute PowerPoint," *New Yorker*; Tufte, "PowerPoint Is Evil," *Wired*; and Keller, "Is PowerPoint the Devil?"

First Google listing for "presentation slides"

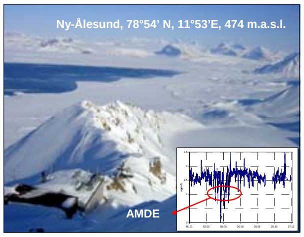
Selected Slides That Reveal a Presentation's Organization

Atmospheric Mercury Depletion Events (AMDEs) in Polar Regions During Arctic Spring

Katrine Aspmo
Torunn Berg
Norwegian Institute for Air Research

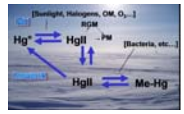
Grethe Wibetoe
University of Oslo, Dept. of Chemistry

June 16, 2004



1

This talk compares theory with measurements and gives the environmental implications



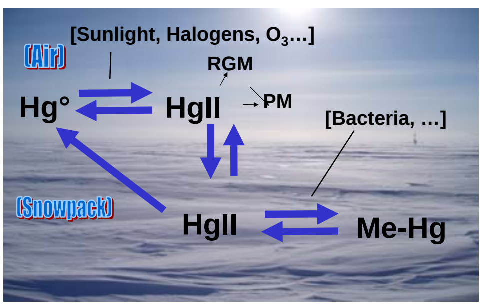
Theory for Hg cycling in Arctic springtime

Measurements from Zeppelin Air Monitoring Station

Environmental implications of AMDEs

2

A theory exists for the cycling of mercury during depletion events in the Arctic springtime



[Lindberg et al., 2002; Steffen et al., 2003]

4

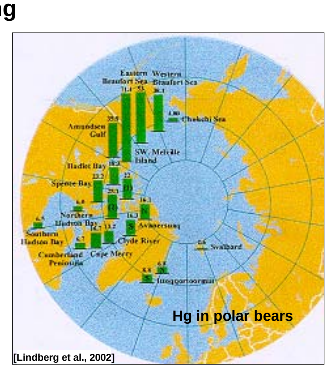
Springtime measurements from Zeppelin mountain agree well with this theory

Particulate Mercury (PM)

Reactive Gaseous Mercury (RGM)

6

Arctic biota show highly elevated Hg levels and are still increasing



[Lindberg et al., 2002]

Global warming may increase the extent of AMDEs

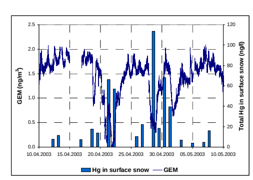
10

In summary, AMDEs lead to increased Hg input to Arctic ecosystems

A significant fraction of the deposited Hg is bio-available

Deposited Hg can be re-emitted

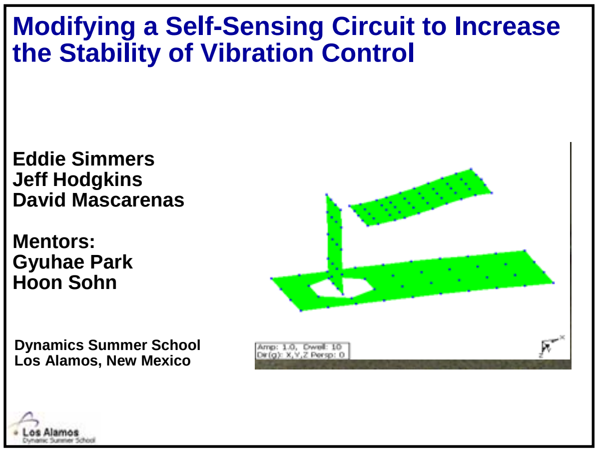
AMDEs can increase as polar climate warms

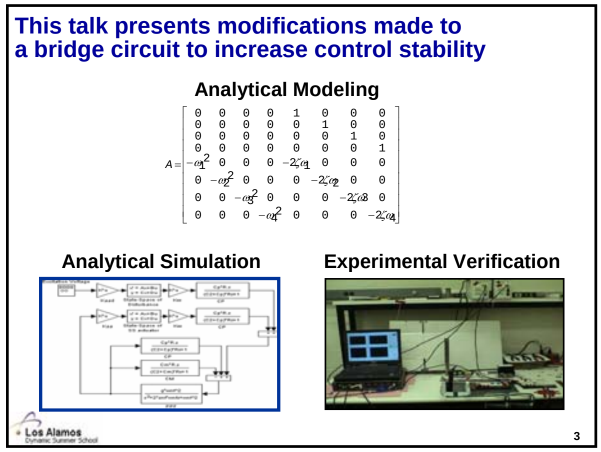


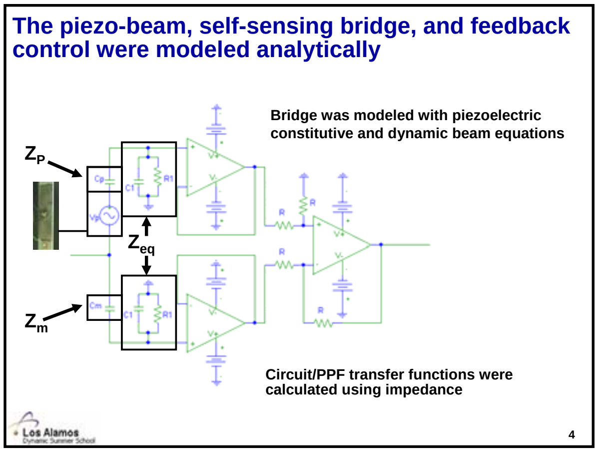
Questions?

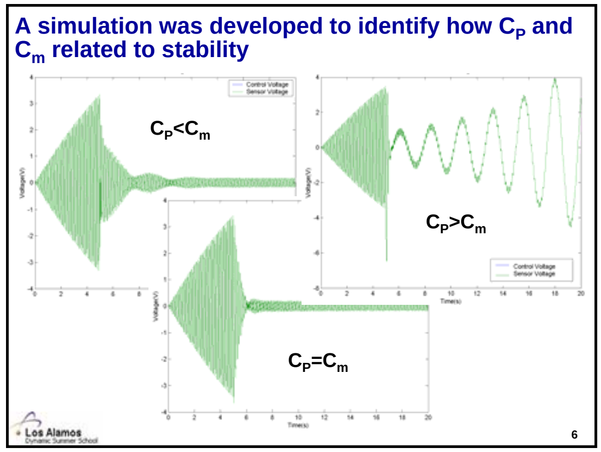
12

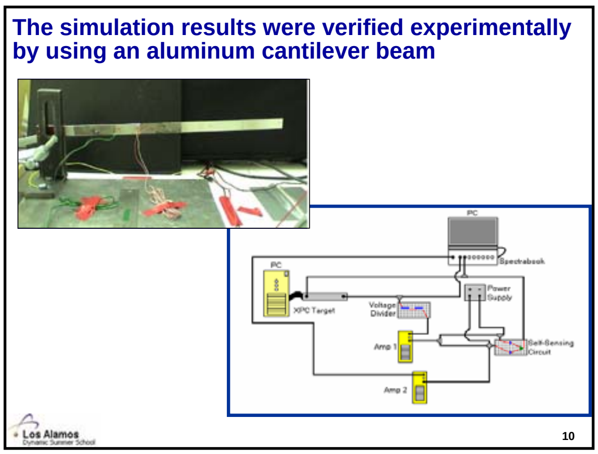
Selected Slides That Reveal a Presentation's Organization

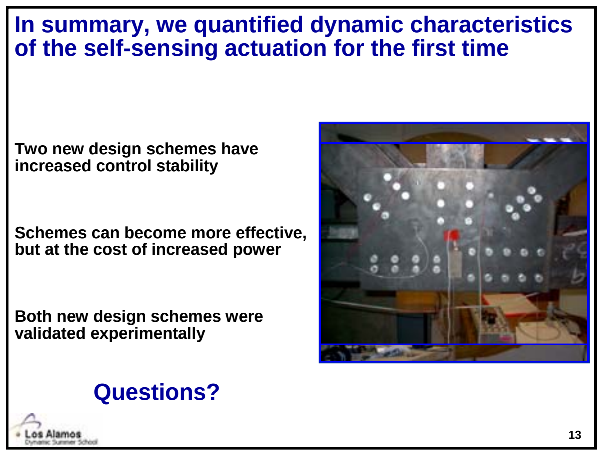












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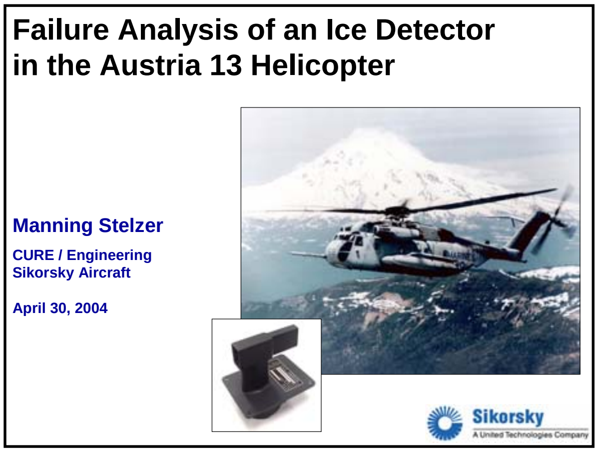

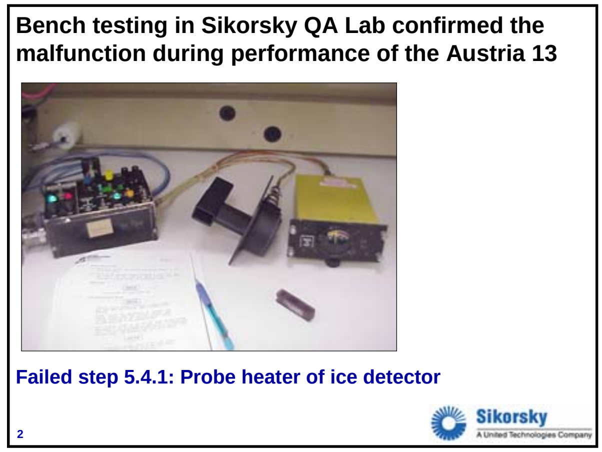

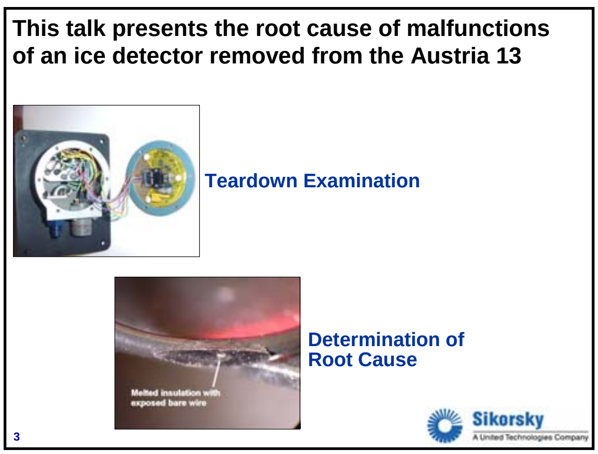

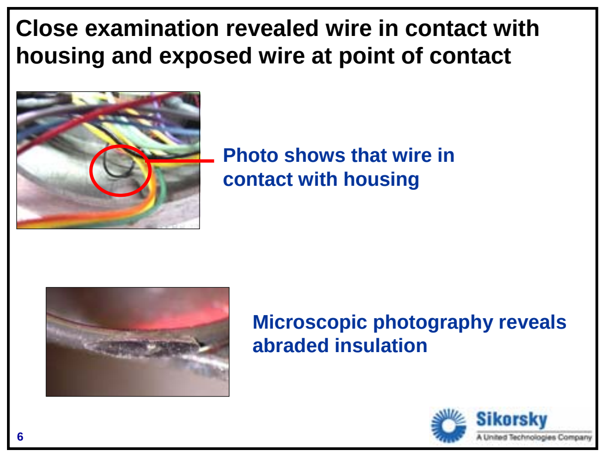

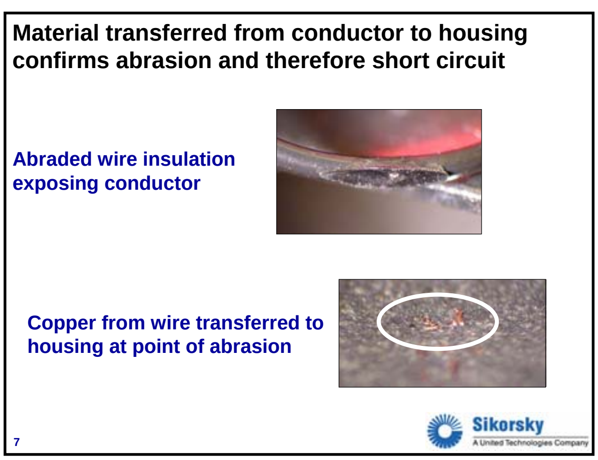

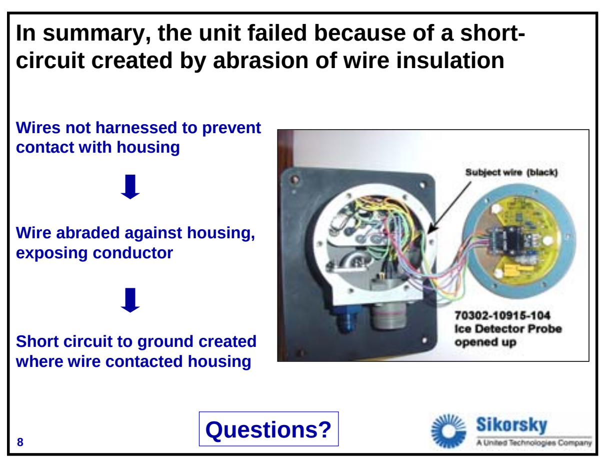

Exercise: Create a title slide that follows the assertion–evidence design

Example

Atmospheric Mercury Depletion Events in Polar Regions During Arctic Spring

Katrine Aspmo
Torunn Berg
Norwegian Institute for Air Research

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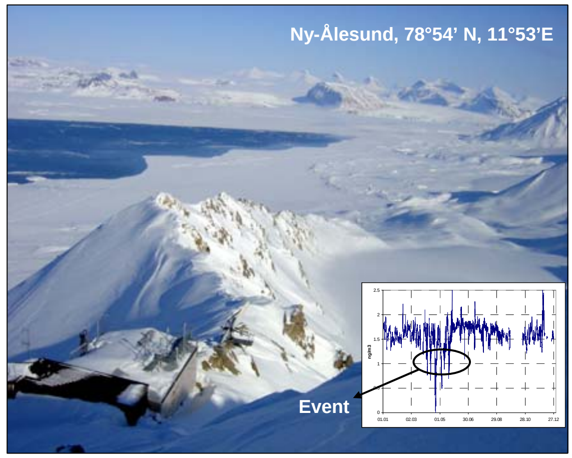
June 16, 2004



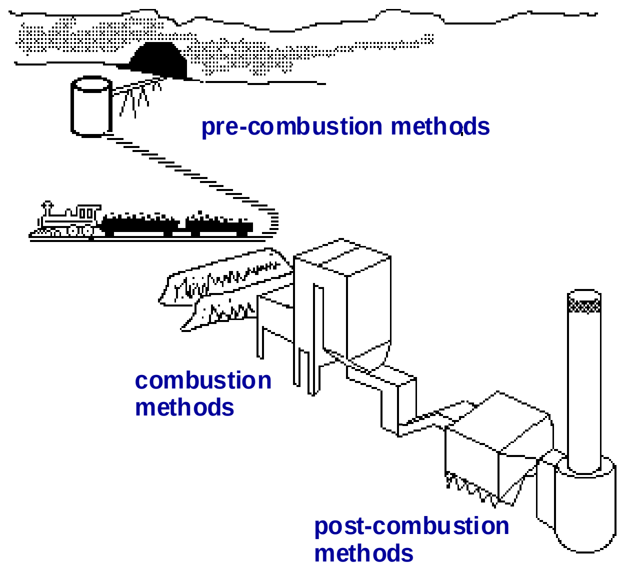
NILU

Your Slide

Exercise: Create a mapping slide that follows the assertion–evidence design

Example

This presentation compares methods for reducing emissions of sulfur dioxide from coal power plants



[Schmidt, 1989]

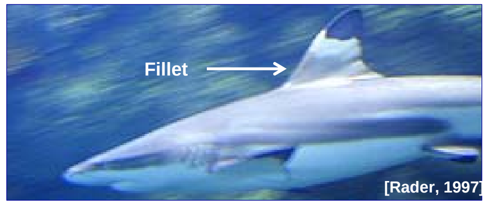
Your Slide

Exercise: Create a body slide that follows the assertion–evidence design

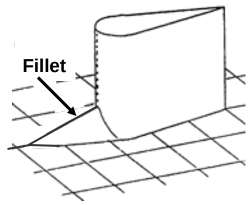
Example

Fillets reduce leading edge vortices in nature and in engineering

Fillet on dorsal fin of shark



Fillet on Seawolf submarine



[Devenport et al., 1991]

[Zess and Thole, 2001]

Your Slide

Exercise: Create a conclusion slide that follows the assertion–evidence design

Example

In summary, the unit failed because of a short circuit created by abrasion of wire insulation

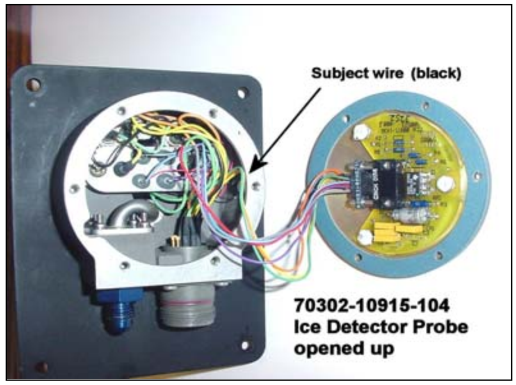
Wires not harnessed to prevent contact with housing

⬇

Wire abraded against housing, exposing conductor

⬇

Short circuit to ground created where wire contacted housing



Questions?

Sikorsky
A United Technologies Company

[Stelzer, 2004]

Your Slide

Engineering by Viewgraphs

The Debris Assessment Team presented its analysis in a formal briefing to the Mission Evaluation Room that relied on PowerPoint slides from Boeing. When engineering analyses and risk assessments are condensed to fit on a standard form or overhead slide, information is inevitably lost. In the process, the priority assigned to information can be easily misrepresented by its placement on a chart and the language that is used. Dr. Edward Tufte of Yale University, an expert in information presentation who also researched communications failures in the *Challenger* accident, studied how the slides used by the Debris Assessment Team in their briefing to the Mission Evaluation Room misrepresented key information.[38]

The slide created six levels of hierarchy, signified by the title and the symbols to the left of each line. These levels prioritized information that was already contained in 11 simple sentences. Tufte also notes that the title is confusing. "Review of Test Data Indicates Conservatism" refers not to the predicted tile damage, *but to the choice of test models used to predict the damage*.

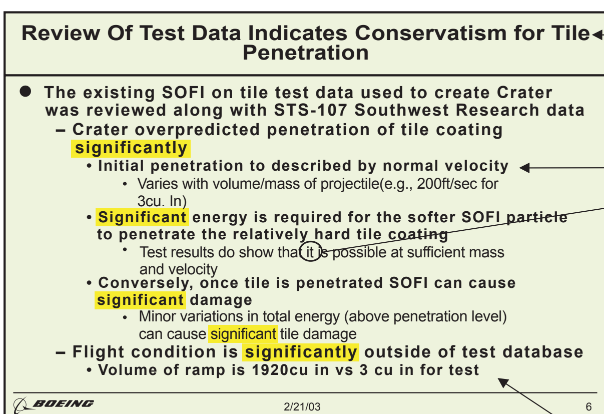
Only at the bottom of the slide do engineers state a key piece of information: that one estimate of the debris that struck *Columbia* was 640 times larger than the data used to calibrate the model on which engineers based their damage assessments. (Later analysis showed that the debris object was actually 400 times larger). This difference led Tufte to suggest that a more appropriate headline would be "Review of Test Data Indicates Irrelevance of Two Models."[39]

Tufte also criticized the sloppy language on the slide. "The vaguely quantitative words 'significant' and 'significantly' are used 5 times on this slide," he notes, "with de facto meanings ranging from 'detectable in largely irrelevant calibration case study' to 'an amount of damage so that everyone dies' to 'a difference of 640-fold.' "[40] Another example of sloppiness is that "cubic inches" is written inconsistently: "3cu. In," "1920cu in," and "3 cu in." While such inconsistencies might seem minor, in highly technical fields like aerospace engineering a misplaced decimal point or mistaken unit of measurement can easily engender inconsistencies and inaccuracies. In another phrase "Test results do show that it is possible at sufficient mass and velocity," the word "it" actually refers to "damage to the protective tiles."

As information gets passed up an organization hierarchy, from people who do analysis to mid-level managers to high-level leadership, key explanations and supporting information is filtered out. In this context, it is easy to understand how a senior manager might read this PowerPoint slide and not realize that it addresses a life-threatening situation.

At many points during its investigation, the Board was surprised to receive similar presentation slides from NASA officials in place of technical reports. The Board views the endemic use of PowerPoint briefing slides instead of technical papers as an illustration of the problematic methods of technical communication at NASA.

The vaguely quantitative words "significant" and "significantly" are used 5 times on this slide, with *de facto* meanings ranging from "detectable in largely irrelevant calibration case study" to "an amount of damage so that everyone dies" to "a difference of 640-fold." None of these 5 usages appears to refer to the technical meaning of "statistical significance."



The low resolution of PowerPoint slides promotes the use of compressed phrases like "Tile Penetration." As is the case here, such phrases may well be ambiquous. (The low resolution and large font generate 3 typographic orphans, lonely words dangling on a seperate line.)

This vague pronoun reference "it" alludes to *damage to the protective tiles,* which caused the destruction of the Columbia. The slide weakens important material with ambiquous language (sentence fragments, passive voice, multiple meanings of "significant"). The 3 reports were created by engineers for high-level NASA officials who were deciding whether the threat of wing damage required further investigation before the Columbia attempted return. The officials were satisfied that the reports indicated that the Columbia was not in danger, and no attempts to further examine the threat were made. The slides were part of an oral presentation and also were circulated as e-mail attachments.

In this slide the same unit of measure for volume (cubic inches) is shown a different way every time

3cu. in **1920cu. in** **3 cu. in**

rather than in clear and tidy exponential form **1920 in^3**. Perhaps the available font cannot show exponents. Shakiness in units of measurement provokes concern. Slides that use hierarchical bullet-outlines here do not handle statistical data and scientific notation gracefully. If PowerPoint is a corporate-mandated format for all engineering reports, then some competent scientific typography (rather than the PP market-pitch style) is essential. In this slide, the typography is so choppy and clunky that it impedes understanding.

The analysis by Dr. Edward Tufte of the slide from the Debris Assessment Team briefing. [SOFI=Spray-On Foam Insulation]

References

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