Rethinking the Design of Presentation Slides

Fillets reduce leading edge vortices in nature and in engineering

Fillet on dorsal fin of shark

Fillet on Seawolf submarine

Source: Chapter 4 in Craft of Scientific Presentations

An advantage of using slides is that audiences remember more when the slides are well-designed
For a technical presentation, you should set high goals for the presentation slides.

Slides should help the audience during the talk.

Slides should serve as notes for the audience after the talk.

Slides should serve colleagues having to make the same talk.

Perfusion is the microscopic flow of blood through tissue. Blood perfusion carries nutrients and waste, regulates heat exchange, and has units of g/s/mL.

This presentation focuses on two common errors made in the design of slides:

Creating slides that no one reads:
- PRIMARY CONCERNS - FIELD JOINT - HIGHEST CONCERN
  - EROSION PENETRATION OF PRIMARY SEAL REQUIRE SECONDARY SEAL FOR PRESSURE INTEGRITY
    - (0-600 MS) HIGH PROBABILITY OF RELIABLE SECONDARY SEAL
    - (170-330 MS) REDUCE PROBABILITY OF RELIABLE SECONDARY SEAL CAPABILITY
    - (330-600 MS) HIGH PROBABILITY OF NO SECONDARY SEAL CAPABILITY
  - EROSION PENETRATION O-RING SEAL - HIGH PROBABILITY OF NO SECONDARY SEAL CAPABILITY
  - BENCH TESTING SHOWED O-RING NOT CAPABLE OF MAINTAINING CONTACT WITH METAL PARTS GAP OPERATING TO MEOP
  - BENCH TESTING SHOWED O-RING CONTACT DURING INITIAL PHASE (0 - 170 MS) OF TRANSIENT

Creating slides that no one remembers:

Presentation Outline
- Introduction
- Background
- Pre-Combustion Methods
  - Coal switching
  - Coal Cleaning
- Combustion Methods
  - Atmospheric Fluidized Bed
- Post-Combustion Methods
  - Adsorption
  - Absorption
- Conclusions
- Questions?
One common error is having a slide format that dissuades the audience from reading.

**PRIMARY CONCERNS - FIELD JOINT - HIGHEST CONCERN**

- EROSION PENETRATION OF PRIMARY SEAL REQUIRES RELIABLE SECONDARY SEAL FOR PRESSURE INTEGRITY
  - IGNITION TRANSIENT - (0-600 MS)
    - (0-170 MS) HIGH PROBABILITY OF RELIABLE SECONDARY SEAL INTACT
    - (170-330 MS) REDUCED PROBABILITY OF RELIABLE SECONDARY SEAL
    - (330-600 MS) HIGH PROBABILITY OF NO SECONDARY SEAL CAPABILITY
  - STEADY STATE - (600 MS - 2 MINUTES)
    - IF EROSION PENETRATES INTO PRIMARY O-RING SEAL - HIGH PROBABILITY OF NO SECONDARY SEAL CAPABILITY
    - BENCH TESTING SHOWED O-RING NOT CAPABLE OF MAINTAINING CONTACT WITH METAL PARTS GAP OPERATING TO MEOP
    - BENCH TESTING SHOWED CAPABILITY TO MAINTAIN O-RING CONTACT DURING INITIAL PHASE (0 - 170 MS) OF TRANSIENT

To avoid this error, an easily read typography and layout are needed.

**Choose legible type**

- Sans serif type

**Choose a helpful layout**

- words
  - words
  - words
  - words
  - words
  - words
Much more effective than PowerPoint’s default layout is a sentence headline supported by images.

The sentence headline succinctly states the main assertion of the slide.

Body supports with images.

Body supports with needed words.

Three criteria are important in evaluating a layout design for presentation slides:

- How memorable is the design?
- How many slides does the design require?
- Does the design help the slides stand as notes?

Fillets reduce leading edge vortices in nature and in engineering.

Fillet on dorsal fin of shark.

Fillet on Seawolf submarine.

[Devenport et al., 1991]
Fillets reduce leading edge vortices in nature and in engineering

Fillet on dorsal fin of shark

Fillet on Seawolf submarine

A strong headline—identifies the slide’s purpose for the audience

identifies the slide’s purpose for the speaker

The experimental setup included a Kapton torus and several sensor/actuator combinations

Torus: 1.8 m ring diameter, 0.15 m tube diameter, and 46µm thick (aspect ratio = 0.08)
Computations show that the fillet prevents the leading edge vortex and delays the passage vortex.
The body of a slide should support the headline primarily with images and with words where needed

Primarily supports with images

Supports with necessary words

- clear
- familiar
- concise

Measurements show that the fillet prevents formation of the leading edge vortex

Velocity profile: vane without fillet

Velocity profile: vane with fillet
Hefner developed a dynamic electro-thermal model for IGBT, focusing on the temperature-dependent IGBT electrical model. The instantaneous power dissipated in the IGBT is calculated using the electrical model and determines the instantaneous heat rate that is applied to the silicon chip thermal model. Hefner incorporated this methodology into the SABER circuit simulator.

Adams, Joshi and Blackburn considered thermal interactions between the heat sources, substrate, and enclosure walls to determine which physical effects and level of detail are needed to accurately predict thermal behavior of discretely heated enclosures.

Chen, Wu and Borojevich are modeling of thermal and electrical behavior using several commercial softwares (I-DEAS, Maxwell, Flotherm and Saber) and 3-D, transient approaches.

Joint Force Projection Concept/Requirement - AXXI
Enabling Strategic Maneuver - (Circa 2010)

Initial Deployment Contingency Response Force (Air)--Ready to fight in 96 hours
- Two Brigade Task Force (Division minus)
- Mission tailored
- Subordinate to JTF
- "In-stride" coordination & team building

Immediate Reinforcement Force (Air)--Ready to Fight in 120 hours
- 1 Armored Mech Brigade TF w/ support & Strike Force
- Mission tailored
- "Plugs" into Initial Deployment Force HQs
- Joint Force support

Campaign Forces: Corps w/ 3 Divisions (Sea/Air)--Ready to fight by C + 30
- 1 Mech/Armor/Inf Division mix
- Capable of conducting sustained, decisive operations as part of Joint Force
- Follow-on Forces (E - Bdes & an additional divisions as required)
A second common error is showing slides that the audience reads, but does not remember

Presentation Outline

• Introduction
• Background
• Pre-Combustion Methods
  –coal switching
  –coal cleaning
• Combustion Methods
  –atmospheric fluidized bed
• Post-Combustion Methods
  –adsorption
  –absorption
• Conclusions
• Questions?

To make slides memorable, you have to consider what to include and what to exclude

This presentation compares several methods for reducing emissions of sulfur dioxide

What to include

What to exclude
Three classes of methods exist for reducing emissions of sulfur dioxide:

1. **Pre-combustion methods**
   - Coal switching and coal cleaning
   - High sulfur mine
   - Low sulfur mine

2. **Combustion methods**
   - Atmospheric fluidized bed separator
   - 90% removal capability
   - Low capital cost—can use in existing equipment
   - High operating cost
   - Ability to use different grades of coal

3. **Post-combustion methods**
   - Absorption
   - 40% removal
   - Adsorption
   - 95% removal

Conclusion:
- By using these methods, coal utilities can greatly reduce SO₂ emissions.
Computational Analysis of the Aerodynamic Energy Required of Morphing Wings

Greg Pettit, Harry Robertshaw, and Daniel J. Inman
Center for Intelligent Materials, Systems and Structures
Air Force Office of Scientific Research (F49620-99-1-0294)
This presentation evaluates composite materials for the bipolar plates of fuel cells

Role of bipolar plates in fuel cells

Comparison of bipolar plate materials

Evaluation of bipolar plate performance

An arresting system shortens the landing distance without sacrificing aircraft performance

Arresting system for aircraft carrier
In summary, the phantom for blood perfusion has many useful applications.

The phantom can—
- produce reasonable and reproducible perfusion
- allow for simple and inexpensive construction
- be modified for future experiments

Questions?
Review of Test Data Indicates Conservatism for Penetration

- The existing SOFI on tile test data used to create Crater was reviewed along with STS-87 Southwest Research data.
  - Crater overpredicted penetration significantly.
    - Initial penetration to described by normal velocity.
    - Varies with volume/mass of projectile (e.g. 200 ft/sec for 3 cu.in).
    - Significant energy is required for the softer SOFI particle to penetrate the relatively hard tile coating.
    - It is possible at sufficient mass.
    - Conversely, once tile is penetrated SOFI can cause significant damage.
  - Flight condition is significantly outside of test database.
    - Volume of ramp is 1920 cu in vs 3 cu in for test.

In summary, the slide design given here is much stronger than PowerPoint’s default design:

- Fillets reduce leading edge vortices in nature and in engineering.
  - Fillet on dorsal fin of shark.
  - Fillet on Seawolf submarine.

The design is more memorable for audience.

The design requires fewer slides (thus better pacing).

The design produces notes that stand alone.

The design creates a more compelling argument.

Summary: page 116 in Craft of Scientific Presentations

Templates: http://writing.eng.vt.edu/csp.html