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

[Devenport et al., 1991]

Source: Chapter 4 in *Craft of Scientific Presentations*

An advantage of using slides is that audiences remember more when the slides are well-designed

Hear

See

Hear and See

Recall (%)
For a technical presentation, you should set high goals for the presentation slides.

**Perfusion is the microscopic flow of blood through tissue**

Blood perfusion—
- carries nutrients and waste
- regulates heat exchange
- has units of g/s/mL

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.

**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 requires reliable secondary seal for pressure integrity
- Ignition transient (0-600 ms)
  - (0-170 ms) high probability of reliable secondary seal
  - (170-330 ms) reduced probability of reliable secondary seal capability
- Steady state (600 ms - 2 minutes)
  - If erosion penetrates primary O-ring seal - high probability of no secondary seal capability
- Bench testing showed O-rings not capable of maintaining contact with metal parts gap operating to MEP
- Bench testing showed capability to maintain 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 PRESSURE INTEGRITY
  - IGNITION TRANSIENT: (0-600 MS)
    - (0-170 MS) HIGH PROBABILITY OF RELIABLE SECONDARY SEAL
    - (170-330 MS) REDUCED PROBABILITY OF RELIABLE SECONDARY SEAL
    - (330-600 MS) HIGH PROBABILITY OF NO SECONDARY SEAL
  - STEADY STATE: (600 MS - 2 MINUTES)
    - IF EROSION PENETRATES, HIGH PROBABILITY OF NO SECONDARY SEAL
      - 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

Difficult to read

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

Choose legible type

Sans serif type

SERIF TYPEFACE

Choose a helpful layout

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.

compressor
turbine

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

Fillets reduce leading edge vortices in nature and in engineering.

Fillet on dorsal fin of shark

Fillet on Seawolf submarine

How memorable is the design?

How many slides does the design require?

Does the design help the slides stand as notes?

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

Fillet on dorsal fin of shark

Fillet on Seawolf submarine

The sentence headline should state succinctly the purpose or assertion of the slide

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](image1)

![Velocity profile: vane with fillet](image2)
**Hefner** developed a dynamic electro-thermal model for IGBT, from the temperature-dependent IGBT electrical model, in terms of the instantaneous temperature of the silicon chip, packages and heat sinks. The instantaneous power dissipated in the IGBT is calculated using the electrical model and determines the instantaneous heat rate that is applied to the surface of 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 encloses walls as affected by the thermal conductance of the walls and substrate, commencing which physical effects and level of detail are necessary for effective 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.

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**Joint Force Projection Concept/Requirement – AXXI**

*Enabling Strategic Maneuver - (Circa 2010)*

**Initial Deployment Force**
- 96 hrs Ready to Fight
- 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)
- Mission tailored
- Subordinate to JTF
- "In-stride" coordination & team building

**Contingency Response Forces**
- 120 hrs Ready to Fight
- Armor/Mech Brigade TF w/support & Strike Force
- Mission tailored
- "Plugs" into Initial Deployment Force HQs
- Joint Force support
- "In-stride" coordination & team building

**Campaign Forces**
- Corps w/ 3 Divisions (+)
- Confident Termination on US dictated terms
- Follow-on Forces (E- Bdes & an additional divisions as required)

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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.
Slides should include key results and images

Results

![Specific Work](image)

<table>
<thead>
<tr>
<th>Temperature Ratio</th>
<th>Pressure Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

Images

![Diagram](image)

Slides should also include signals for the presentation’s organization

Beginning

Middle

Ending

**Beginning**

**Middle**

**Conclusion**

**Methods to Reduce Sulfur Dioxide Emissions From Coal-Fueled Utilities**

Coal switching and coal cleaning are two pre-combustion methods.

1. Coal switching and coal cleaning:
   - Coal handling
   - Grid inlet
   - Cleaning
   - Removal
   - Ability to use different grades of coal

2. The most efficient combustion method is an atmospheric fluidized bed separator:
   - 90% removal capability
   - Low capital cost—can use in existing equipment
   - High operating cost

By using these methods, coal utilities can greatly reduce SO2 emissions.

**Percentage Reduction of SO2**

- Coal cleaning: 25%
- Coal switching: 50%
- Fluidized bed absorption: 75%
- Adsorption: 80%
- Conclusion: 90%
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
    - 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

- 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](http://writing.eng.vt.edu/csp.html)