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2.00AJ / 16.00AJ Exploring Sea, Space, & Earth: Fundamentals of Engineering Design
Spring 2009

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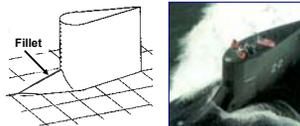
Rethinking the Design of Presentation Slides

Fillets reduce leading edge vortices in nature and in engineering

Fillet on dorsal fin of shark



Fillet on Seawolf submarine



[Devenport et al., 1991]

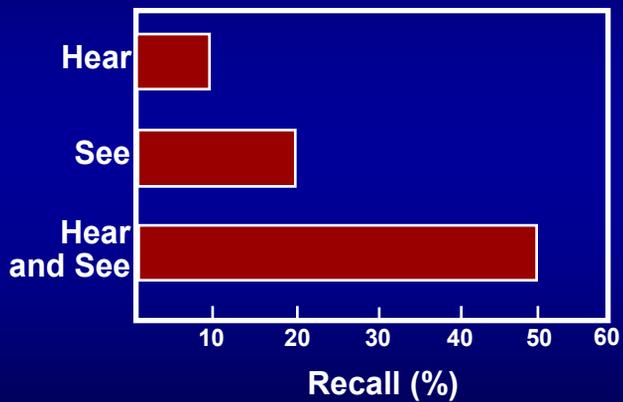


Michael Alley
College of Engineering
Virginia Tech

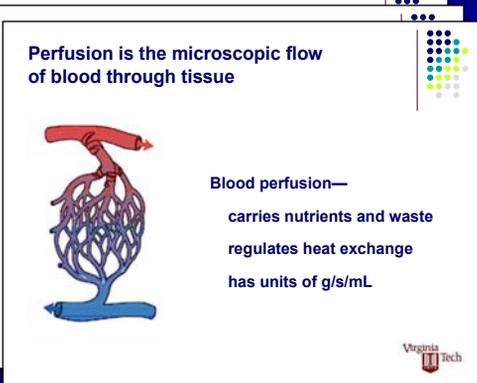
Source: Chapter 4 in *Craft of Scientific Presentations*



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

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 EROSION PENETRATION THROUGH SECONDARY SEAL
 - (170-330 MS) REDUCED PROBABILITY OF EROSION PENETRATION THROUGH SECONDARY SEAL
 - (330-600 MS) HIGH PROBABILITY OF EROSION PENETRATION THROUGH SECONDARY SEAL CAPABILITY
- STEADY STATE - (600 MS)
 - IF EROSION PENETRATION THROUGH 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 MEQP
 - 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 FOR PRESSURE INTEGRITY
 - IGNITION TRANSIENT - (0-600 MS)
 - (0-170 MS) HIGH PROBABILITY OF RELIABLE SEAL
 - (170-330 MS) REDUCED PROBABILITY OF RELIABLE SEAL
 - (330-600 MS) HIGH PROBABILITY OF NO RELIABLE SEAL
- STEADY STATE - (600 MS - 2 MINUTES)
 - IF EROSION PENETRATES PRIMARY SEAL, HIGH PROBABILITY OF NO SECONDARY SEAL
 - BENCH TESTING CAPABLE OF MAINTAINING CONTACT WITH MECHANICAL SPRING TO MEOP
 - BENCH TESTING CAPABILITY TO MAINTAIN O-RING CONTACT DURING INITIAL (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
words
words

words



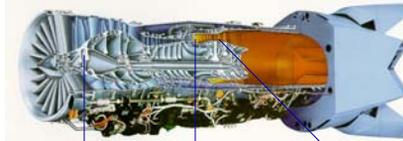
Much more effective than PowerPoint's default layout is a sentence headline supported by images

Sentence
Headline

The sentence headline succinctly states
the main assertion of the slide

Support
in Body

Body supports
with images



Body supports
with needed words

compressor

combustor

turbine



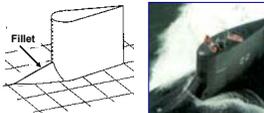
Three criteria are important in evaluating a layout design for presentation slides

Fillets reduce leading edge vortices in nature
and in engineering

Fillet on dorsal fin
of shark



Fillet on Seawolf
submarine



[Devenport et al., 1991]



How memorable is the
design?

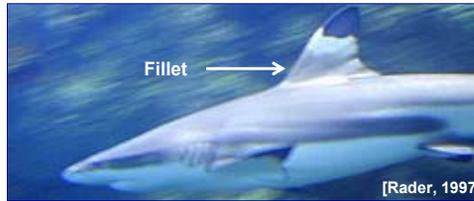
How many slides does the
design require?

Does the design help the
slides stand as notes?

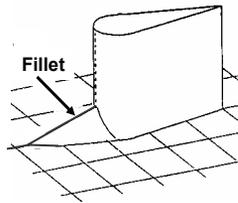


Fillets reduce leading edge vortices in nature and in engineering

Fillet on dorsal fin of shark



Fillet on Seawolf submarine



[Devenport et al., 1991]



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

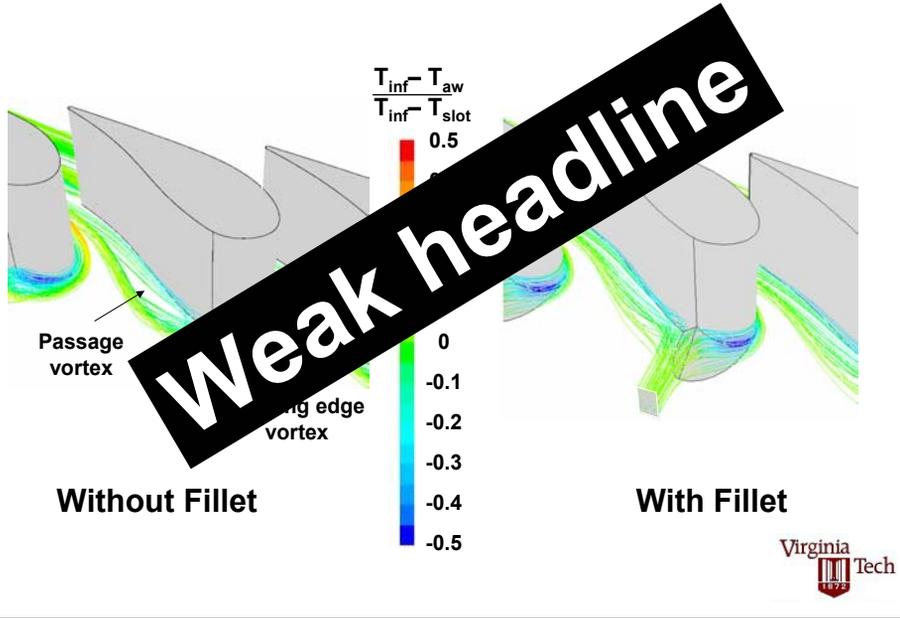
The experimental setup included a Kapton torus and several sensor/actuator combinations



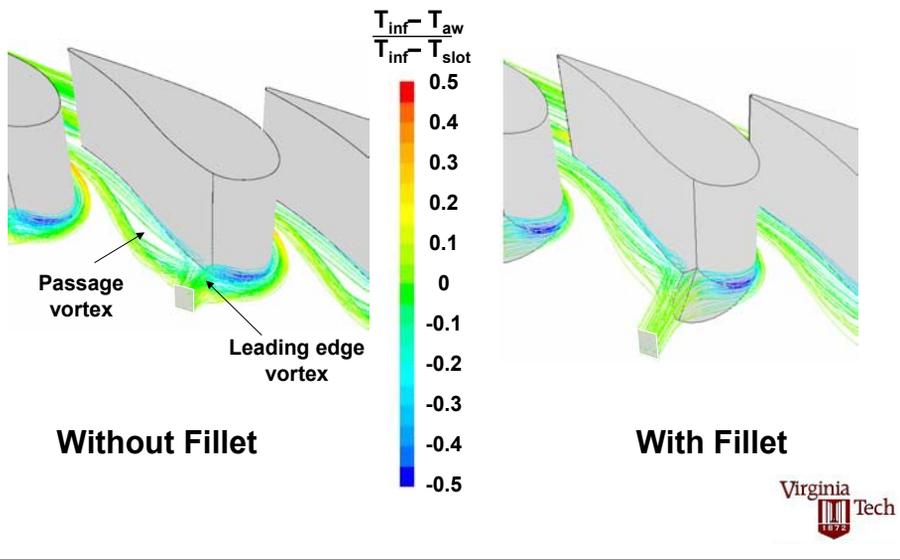
Torus: 1.8 m ring diameter, 0.15 m tube diameter, and 46 μ m thick (aspect ratio = 0.08)



Results

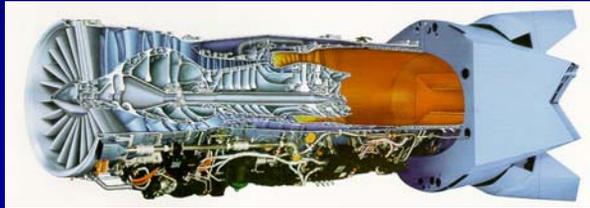


Computations show that the fillet prevents the leading edge vortex and delays the passage vortex



The body of a slide should support the headline primarily with images and with words where needed

Primarily supports with images

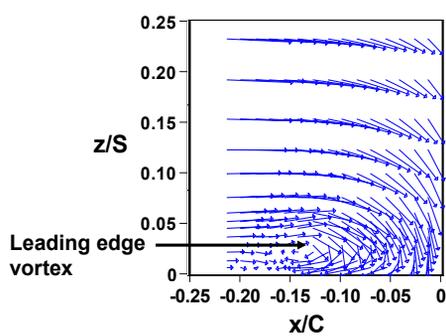


Supports with necessary words

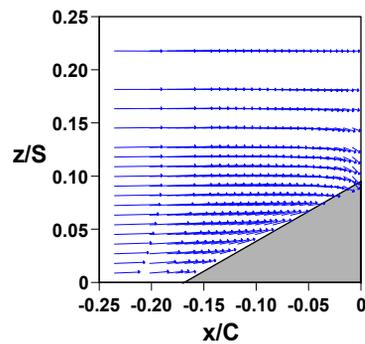
clear
familiar
concise



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



Velocity profile:
vane without fillet

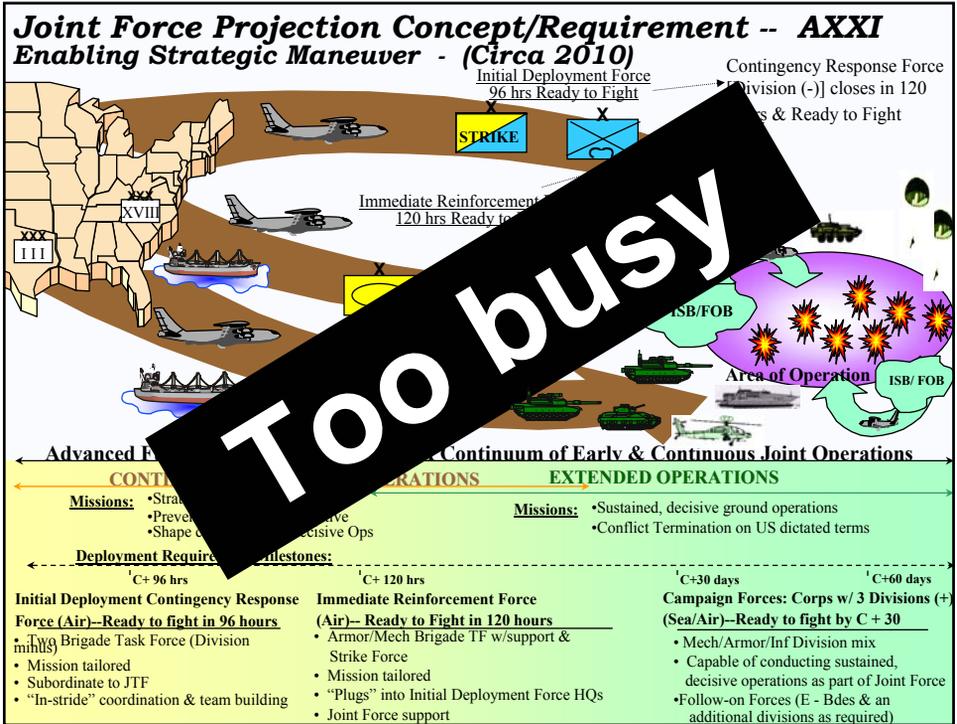


Velocity profile:
vane with fillet

Literature Review

- Hefner developed a dynamic electro-thermal model of a power MOSFET. The model is a temperature-dependent IGBT electro-thermal model. The model is presented in terms of the instantaneous and average power dissipation. The model is used to simulate the instantaneous and average power dissipation of the silicon chip. The model is used to simulate the SABER circuit.
- Adam et al. developed a model of the interactions between the heat sources, sinks, and walls of a system. The model is used to determine the thermal behavior of discretely heated enclosures. The model is used to determine the thermal behavior of discretely heated enclosures.
- Chen, Wu and others are modeling of thermal and electrical behavior using several commercial softwares (I-DEAS, Maxwell, Flotherm and Saber) and 3-D, transient approaches.

Too many words



Too busy

A second common error is showing slides that the audience reads, but does not remember

Presentation Outline

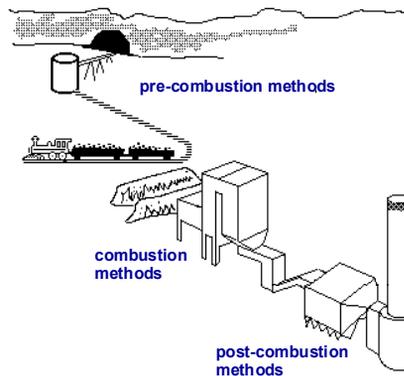
- Introduction
- Background
- Pre-Combustion Methods
 - coal switching
 - coal cleaning
- Combustion Methods
 - atmospheric fluid bed
- Post-Combustion Methods
 - adsorption
 - absorption
- Conclusions
- Questions?

Not memorable



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



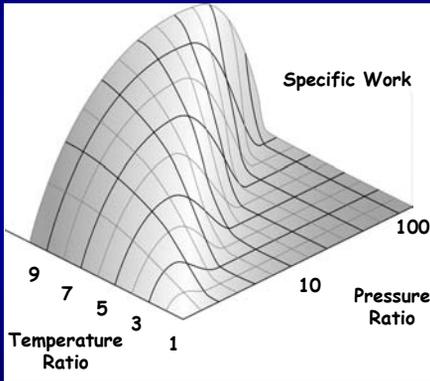
What to include

What to exclude

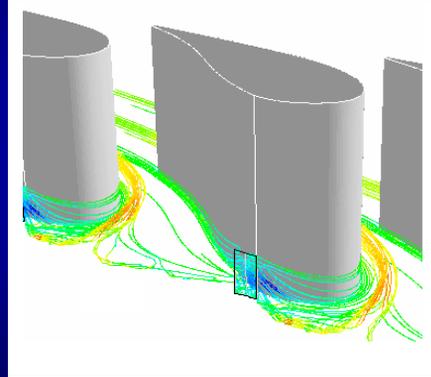


Slides should include key results and images

Results



Images



Slides should also include signals for the presentation's organization

Beginning

Methods to Reduce Sulfur Dioxide Emissions From Coal-Fueled Utilities

Cynthia Schmidt
Mechanical Engineering Department
University of Texas

Three classes of methods exist for reducing emissions of sulfur dioxide

Mapping

Middle

Coal switching and coal cleaning are two pre-combustion methods

Middle 1

The most effective combustion method is an atmospheric fluidized bed

Middle 2

- High operating cost
- Ability to use different grades of coal

Ending

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

Method	Percentage Reduction of SO ₂
coal cleaning	40%
coal switching	20%
fluidized bed	50%
atmospheric	55%
etc.	65%

Conclusion



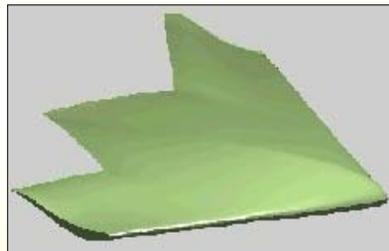
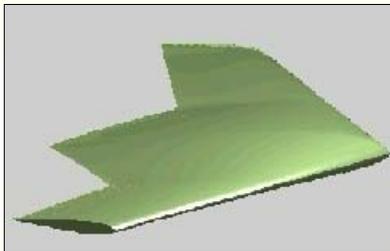
Computational Analysis of the Aerodynamic Energy Required of Morphing

**Needs image
to orient**

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)



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



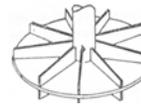
Comparison of bipolar
plate materials



Evaluation of bipolar
plate performance



An arresting system shortens the landing
distance without sacrificing aircraft performance



arresting
system

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?

Questions?
Missed Opportunity

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 S... Research data
 - Crater overpredicted penetration significantly
 - Initial penetration to depth
 - Varies with volume (3cu.in)
 - Significant... Crater SOFI particle to penetration coating
 - ... possible at sufficient mass
 - Co... is penetrated SOFI can cause significant damage
 - Flight conditions is significantly outside of test database
 - Volume of ramp is 1920cu in vs 3 cu in for test

Too many levels of detail



2/21/03

6

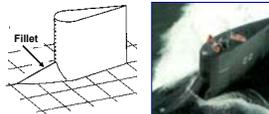
In summary, the slide design given here is much stronger than PowerPoint's default design

Filletlets reduce leading edge vortices in nature and in engineering

Filletlet on dorsal fin of shark



Filletlet on Seawolf submarine



[Devenport et al., 1991]



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>

