



**Be Better Than Bullets (redux):  
A Presentation About Presentations  
Fall 2017**

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- College of Engineering, Cornell University
- IEEE Professional Communication Society

<http://chec.engineering.cornell.edu>

**CHEC:**  
**Cornell Help for**  
**Engineering Communication**



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Visuals

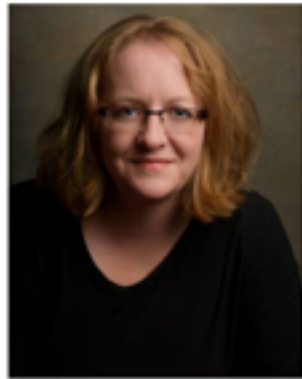
Using Sources

Punctuation

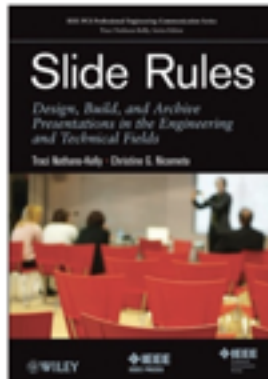
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All students should feel free to use this resource!



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Christine  
Nicometo

Today's presenter: Traci Nathans-Kelly, Ph.D., currently teaches full-time at Cornell University in the Engineering Communications Program. As well, she instructs for the University of Wisconsin-Madison in the Engineering Professional Development department, working with the Master of Engineering Management (formerly M E in Professional Practice–MEPP) and Masters of Engineering in Engine Systems (MEES) online graduate programs. This degree accepts practicing professional engineers and technical experts after they have been on the job for five years (some are Boeing employees!). She instructs a variety of topics, including technical communication (graduate and undergraduate), technical presentations (graduate and undergraduate), technical editing, writing user manuals, and other courses. As a member of IEEE's Professional Communication Society, she serves as a series editor for the *Professional Engineering Communication* books and participates at the national level for that organization. She has been active in the Society for Technical Communication (STC) as Senior Member, where she was the Manager for International Technical Communication Special Interest Group, she was a member of the Committee on Global Strategies, and she judged at the international level for the STC Publications contests for scholarly journals, scholarly articles, and information materials.

Christine G. Nicometo, M.S., (Traci's colleague and writing partner) has taught technical communication courses for undergraduate and graduate students at the University of Wisconsin–Madison campus since 2003. She instructs for the University of Wisconsin-Madison in the Engineering Professional Development department, working with the Masters of Engineering Management), the Masters of Engineering in Engine Systems (MEES), and the Masters of Engineering in Sustainable Systems Engineering (SSE) online graduate programs. She received her master's of science degree in Rhetoric and Technical Communication from Michigan Technological University, where she taught technical communication and English as a Second Language (ESL) courses. She also taught ESL courses at Finlandia University where she was the director of a federal, TRIO, Student Support Services grant. Her interests lie in discovering how technology alters the ways we communicate, learn, and teach. She has directed nationally funded K-12 technology workshops and is currently the director of the New Educator's Orientation workshop in the College of Engineering at UW-Madison.

Email:

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# What does or does not work?

+

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## Interactive

- Too much text
- People read the text
- Speakers should have positive attitude
- Laser pointers are a problem
- Graphs or visuals are problematic
- Unorganized, hard to follow

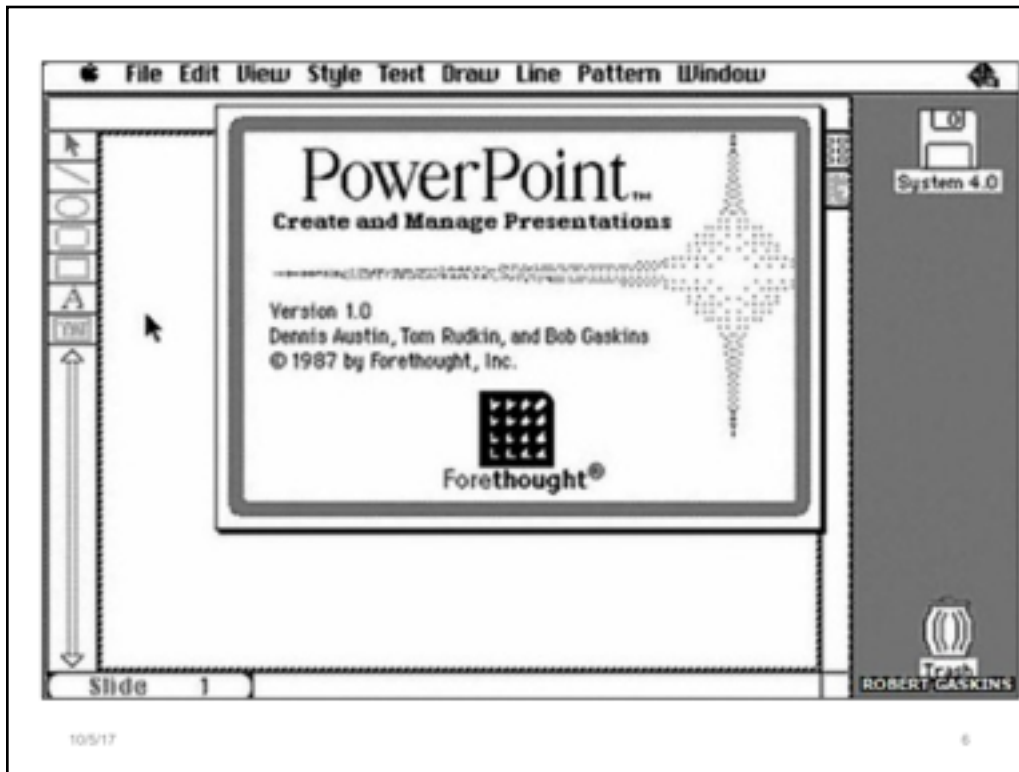
etc

Let's look at some  
less-than-optimal examples.

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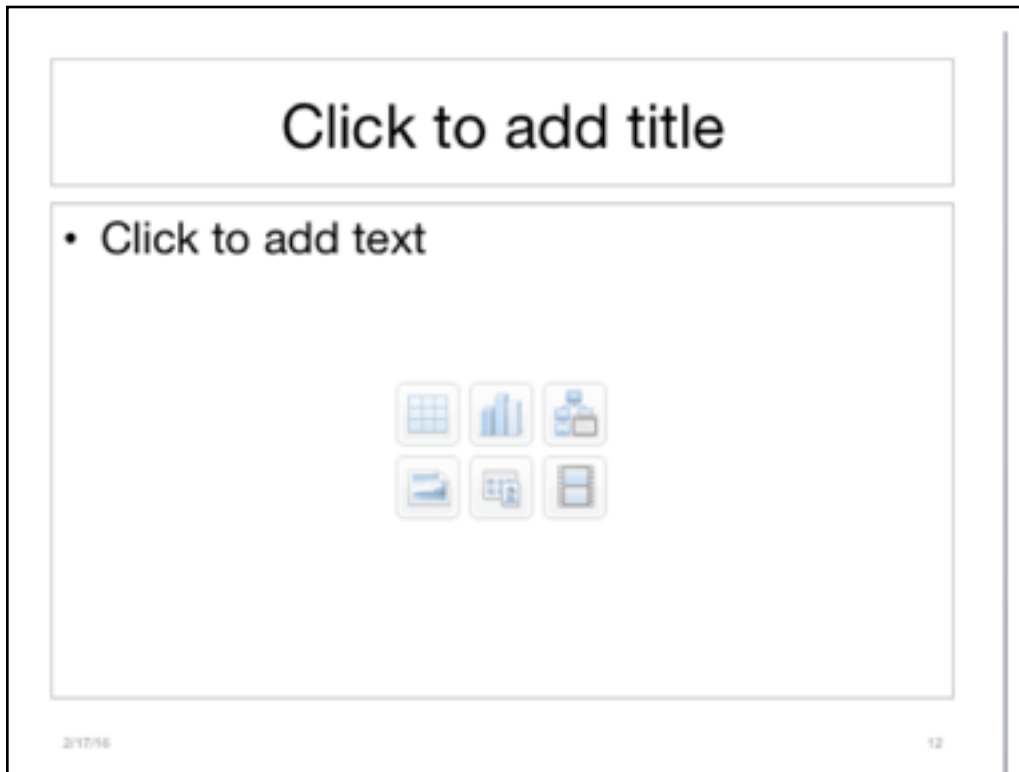
5

You will see examples herein from a variety of engineering fields.



We need to understand how we got to the messy place, where we are now, with slides. Understanding this short story will help users understand how and why to enact change in their techniques and patterns of use.


1987: Robert Gaskins markets PowerPoint, which is a rebranded version of a Mac product called Presenter.



Poor practices come from the templates themselves! Just look at the screenshot from this very same slide deck that I'm using now.

This is almost every template you will ever see. It encourages short headings and bulleted text.

And what does that do to presenters?



## Need for Water Rate System to Spread

Rural Water Supply Project in Sub-Saharan Africa

**Cost Recovery as a Rule – Users' Responsibility to Bear the O & M Cost**

- For Hand pumps: costs for replacement of parts, repair of breakdown, renewal of hand pump, etc.
- For Piped Water System: operation cost (power/fuel, repair), personnel cost

**Delay of fee collection causes stoppage of water supply, and this situation**

- Makes users return to previous, unsafe and far water sources;
- Leads to health problems, such as an outbreak of cholera; and
- Deprive the opportunities of productive activities and schooling due to the needs to fetch water from a distant source.

Why water rate is not firmly established?

- No awareness of the necessity to pay on the part of the people
- Mistrust on fee collection and financial management

Projects towards:

- Motivation to pay for water
- Enhancement of management capacity

Japan International Cooperation Agency

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We see here a variety of less-than-optimal practices. There's a fragmented header, too much text, and it's too crowded. While the impulse to share information is nice, this kind of slide doesn't support the speaker well or engage the audience. A slide like this will compel audience members to stare at it, rather than paying attention to the expert speaker in the room. This is undesirable.

Source: JICA

### **Operation and Maintenance of Rural Water Supply Facilities in Sub-Saharan Africa**



## Why Measure Turbidity?

- Removes pathogens and protects public health.
- Turbidity removal has been shown to be directly related to removal of *Giardia* and *Crypto*.
- Turbidity maximum contaminant levels (MCLs) are based on the technology used:
  - $\leq 0.3$  NTU (95% of the time) for conventional or direct filtration; always  $< 1$  NTU.
  - $\leq 1$  NTU (95% of the time) for slow sand, cartridge, and membrane; always  $< 5$  NTU.

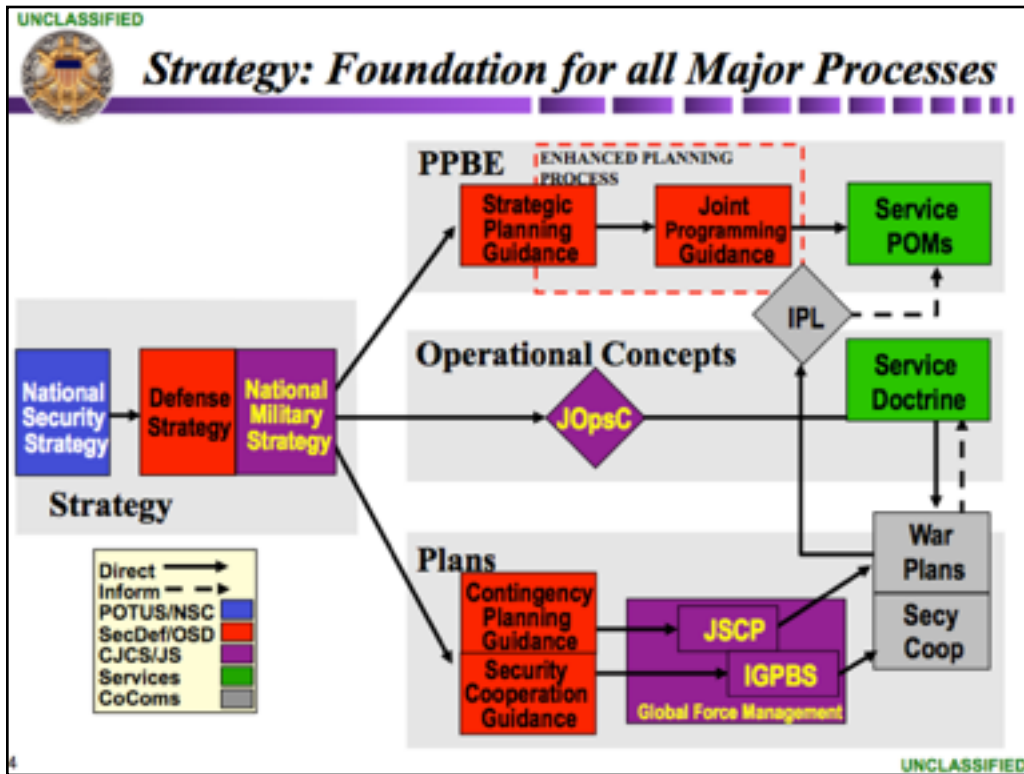
Here is another example of where the information is great, but the use of this kind of slide is not going to work. Information transfer just cannot happen when the audience is being overwhelmed with facts while also trying to listen to a speaker. In cases like this, the speaker has given the entire platform to the slide, which is a shame. We need to focus on the speaker/expert in the room.

### 3. **Disinfection**

- The addition of the chemical chlorine,
- The chemical is added to our water at different points in the treatment process.
- When chlorine is added at beginning pre-chlorination.
- After the filtration stage it is known as post-chlorination.
- Superchlorination when the levels of bacteria are high.
- Sulphur dioxide is then added to remove excess chlorine

More is the same kind of issue.

Here, too, notice that the background has become a distraction and even a hindrance for readability. Don't let templates control the information!



When folks are tired of bullets, they make overly complicated graphics. Again, the gesture was in the right spirit, but the slide tool was not being put to its best purpose.

And while visuals came into play, people forgot to layer them in. So when something like this appeared on the screen, the audience tunes out the speaker and begins to concentrate on figuring out the complex picture. When a complicated visual is used, the speaker may as just leave the room because nobody is listening.

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Slide source:

## National Military Strategy Precision Strike Association

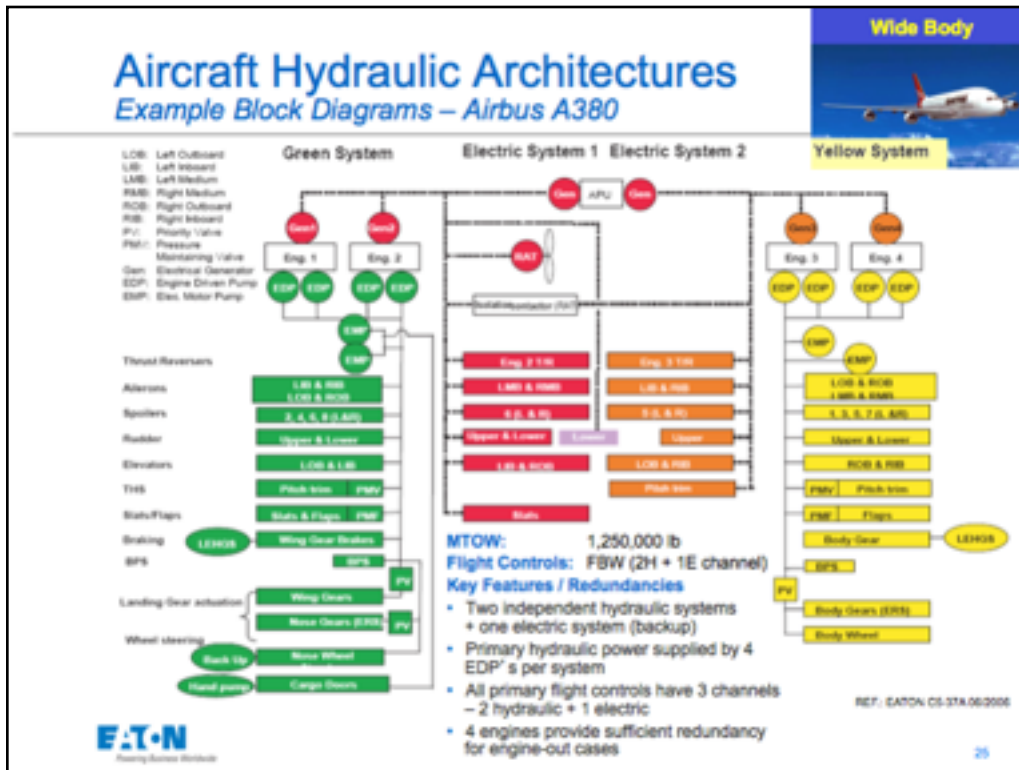
Winter Roundtable, January 26, 2005

CAPT Jeff Hesterman

Chief, Strategy Division

Deputy Director, Strategy and Policy

Joint Staff



...and more pictures that are just too complex for a talk OR for being on a large screen.

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Slide source:  
 Aircraft Hydraulic System Design  
 Peter A. Stricker, PE  
 Product Sales Manager  
 Eaton Aerospace Hydraulic Systems Division  
 Aug 2010

## 1. Introduction

### Groundwater Withdrawal from Wells by Means of Buckets or Pumps



Source: IWRM (n.p.); NE (n.p.); WATER CHARITY (n.p.); BAWAGNY (2011)

Source:  
<http://www.flickr.com/photos/foodforthepeople/10023884149/>  
(Accessed: 07.08.2012)

Again, there are some poor practices here, but a few things are starting to go right.

Poor:

Fragment header

Poor contrast on the word boxes

Better:

Pictures!

Credit for pictures (which later I will show you can go in the notes to clean up the slide)

# Safety Culture

Engineering, Operations & Technology | Boeing Test & Evaluation Production Flight Test

- **Learning Organization**
  - **Organizational structure**
    - Team of airplane model Lead Pilots and Systems Operators
    - Drive distribution of information
  - **Sharing of information and “Lessons Learned”**
    - Aircrew meetings
    - Blogs
- **Risk Management Concepts**
- **Safety Program**
- **Training Program**
- **High Standards**
  - **Operational Flight Test Excellence**
  - **Motivated, capable, and experienced flight crews**

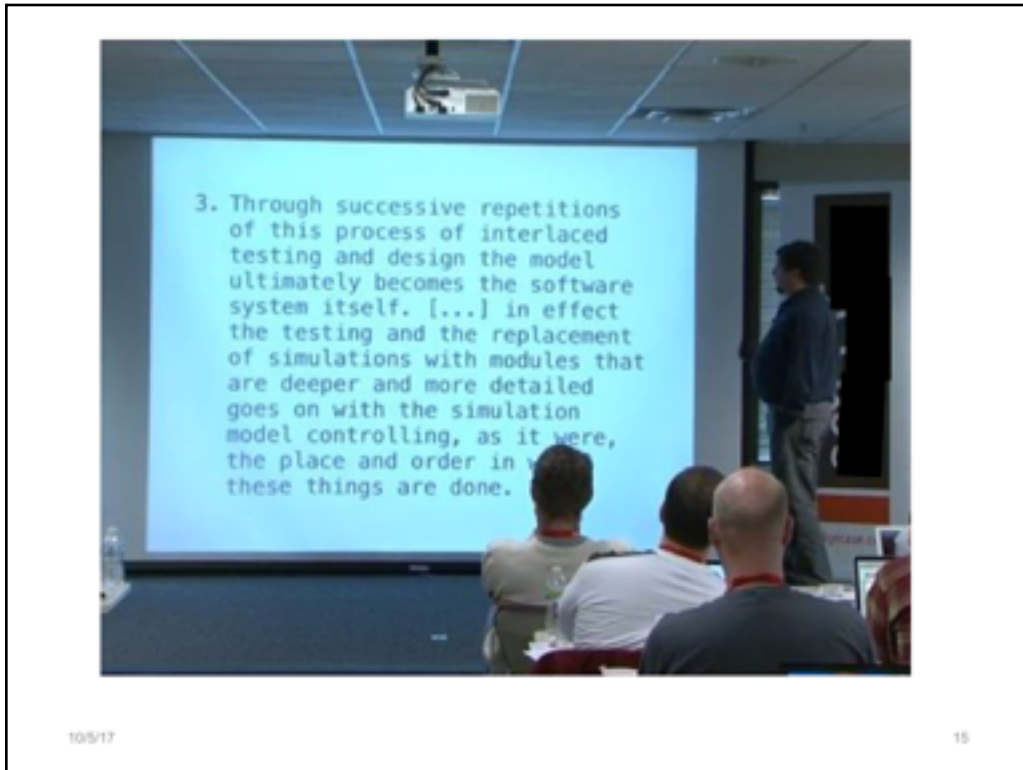


Copyright © 2011 Boeing. All rights reserved. PPT PPT Symposium 14

Now, slides like this one, too, just like the others, have a generous spirit behind them. The impulse here is to provide all of the information on the slide, as the presenter has the idea that everyone will “need all of this information.” There is no argument there—they probably DO need all of the information. However, slides like this miss their purpose because they are both poor help during the talk and severely lacking as archival material after the fact. Indeed, the impulse to share is a good one, but it can be done much better for technical talks.

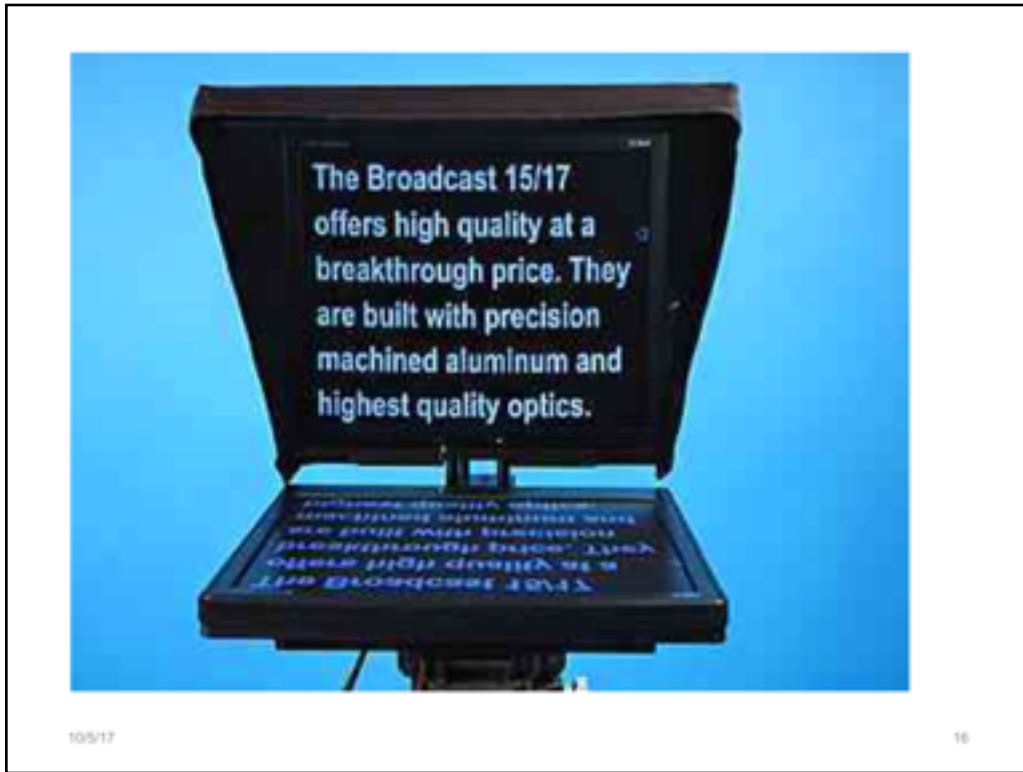
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Slide Source: **Boeing’s Perspective on FCF Risk Mitigation**. Captain Gary Meiser, Chief Pilot, Production Flight Test, Boeing Test and Evaluation. *Presentation to the Flight Safety Foundation, Functional Check Flight Symposium, Vancouver, BC, 8-9 February, 2011.*



As sad as it is to say, everything you see here is precisely wrong about presentations.

- 1.too much text
- 2.the speaker is reading it
- 3.the speaker is not facing the audience
- 4.it is dark
- 5.the slide is a glowing monolith...an attention hog



We have become a culture where technical presentation slides are nothing more than teleprompters...and that needs to change. We want the EXPERT in the room, talking to the audience authentically.





Speakers should reconsider the slides as a tool, using them more like JumboTrons.

Our mistake comes when we forget that slides are meant to be, during the live talk, more of a JumboTron than a teleprompter.

Photo credit: Ken Beldon. Used with permission.

# There are two lives for slides.



The Talk



The Archive

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Slide decks have two lives, and the slide files should support both of those efforts simultaneously. As such, the slide deck becomes an efficient, elegant, rich technical document that has longevity and vitality within organizations.

Today, we are going to begin the conversation about how to accomplish those seemingly at-odds objectives so that your work, housed in slides, carries the technical weight and purpose that it is meant to carry.

Three simple changes will enrich  
the entire technical endeavor.

Sentence Headers



Optimized Visuals



Archival Notes

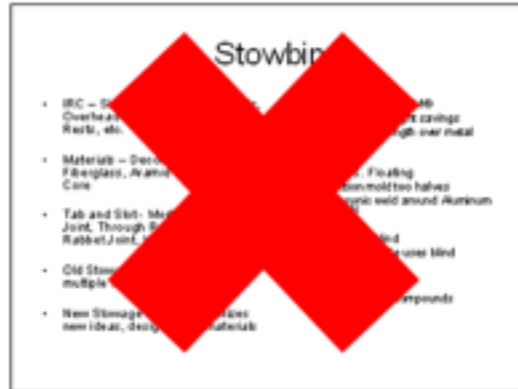
# 1

## Sentence Headers

The old ways don't work for anyone.

**Traditional model**

=



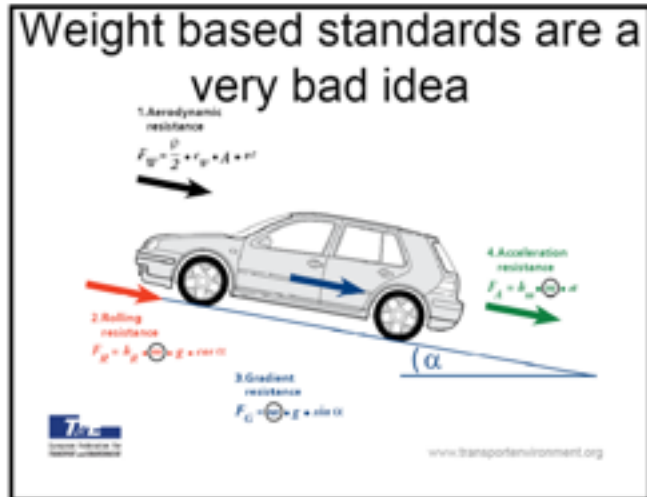
Remember that list we created at the start?

The first way to combat many of the problems we listed there is to get rid of the old models that use fragments for headings. Such snippets of thought only produce confusion and prompt guessing games for the audience. And those short headings are next to useless as archival material.

Slide source: via private email with colleague at Lockheed Martin

There are better ways to showcase technical content.

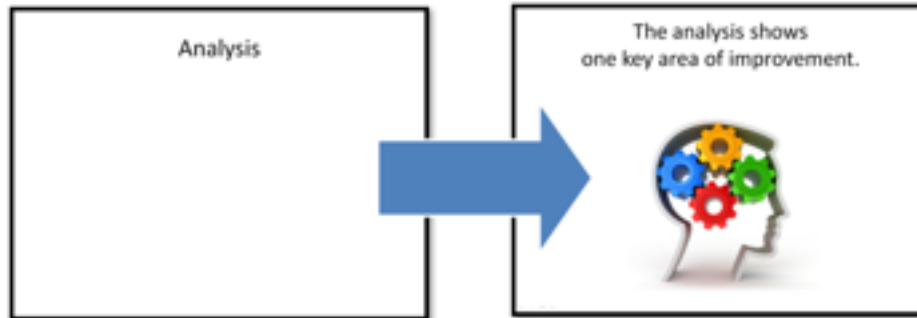
New model =



Instead, using full sentence headers allows for one complete thought to be brought forth. Then, the point can be elaborated upon to great degree.

Slide source: Jos Dings.

Sentence headers also help speakers organize and remember better.



One of the strongest changes you can make to your slides is to use full, short, sentence headers.

Instead of using fragments, or brief phrases, as the basis for your outline, challenge yourself to outline with complete thoughts. This sentence header acts as an executive summary for your learners.

Without having to struggle to fill in the blanks in your thinking, your audience will be better able to retain the information and ideas you are presenting. In addition, your assertions will leave little doubt in your audience's mind as to the direction of your presentation.

## How does the filter remove contaminants?

- The schmutzdecke consumes and adsorbs/absorbs organic contaminants
- Layers of sand strain out particulate contaminants due to the small pores created by fine sand particles

A layer of Schmutzdecke

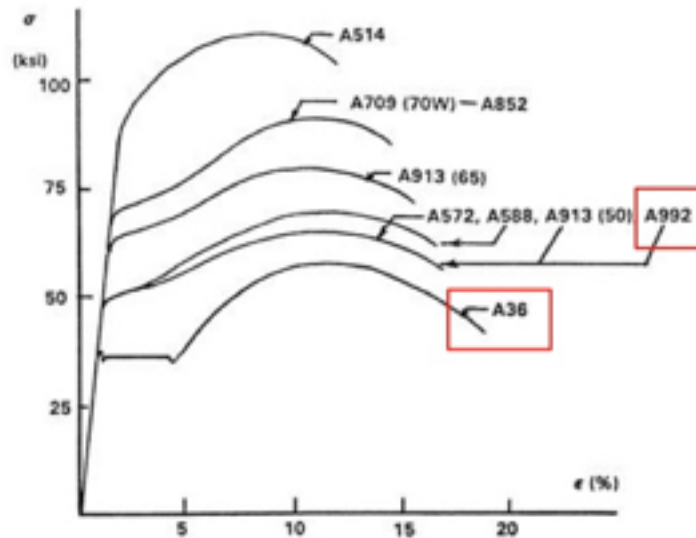


We are moving in the right direction here, but I would advise not using questions as the header UNLESS you actually want the audience to respond. Using questions as transitions is a rookie move.

There's still too much text, but a semi-large photo is a move in the right direction.



Displayed is the stress-strain curve for the steel in the current structure and proposed new structure.



This is a great example of how highly technical information can be used with a sentence header. The sentence header is a bit weak, however, since it merely is saying “Here is some stuff. Take a look.” You can make a stronger claim about the information than that.

Notice, too, the boxes where the speaker wanted to make a point. These work much better for archival purposes...where a laser would fail after the live event.

## Having two sloped bottoms leaves more space for plate settlers

Two sloped bottoms

vs

One sloped bottom



HRS - Plate Settlers | Research | Final Presentation Spring 2016

In this great example from AguaClara spring 2016, we see a good sentence header in place. Well done!

Slide Source:

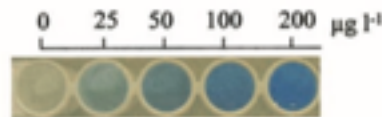
HRS Plate Settlers, spring 2016 Agua Clara

# 2

## Optimized Visuals

## We are pursuing an alternative and more promising method.

- Utilized reaction between dissolved arsenic, ammonium molybdate, and ethyl violet to determine arsenic concentration.
- The method provided quantitative and qualitative results.
- The spectroscopic detection limit was  $4 \mu\text{g/L}$  of Arsenic, well below EPA standards of  $10 \mu\text{g/L}$ .



Arsenic Sensor | Research | Symposium Presentation Spring 2017

From an AguaClara talk...we see some nice moves here. There is a visual, and it's helpful. However, the bullets might be a problem because they come in all at once. This could be overwhelming for the audience. In the least, audiences will read ahead and quit paying attention to the speaker. A better way to approach this issue is IF you are going to use bullets, bring them in one by one just as you need them and not before.

---great notes from the Notes Pane are below, from the original-----

Speaker: [Kevin Juan](#)

Source for EPA standards: <https://www.epa.gov/dwreginfo/chemical-contaminant-rules>

Figure 1: Treated solutions of various concentrations of arsenic contaminated water, showing qualitative effectiveness of the procedure.

Figure 1 Source: Morita, K. and Kaneko, E. (2006). Spectrophotometric Determination of Arsenic in Water Samples Based on Micro Particle Formation of Ethyl Violet-Molybdoarsenate. *Analytical Sciences*, 22(8):1085–1089.

The other method considered was developed by Morita and Kaneko, which utilized the reaction between dissolved arsenic, ammonium molybdate, and ethyl violet to determine arsenic concentrations spectroscopically in 50 mL water samples. One of the stipulations of the process was that the raw water be treated with 1 mL of 0.1M Bis-Tris buffer (pH=7.3) and passed through a column containing an anion exchange resin. The purpose of this step was to remove phosphates from the water that would otherwise interfere with the detection of arsenic as the two compounds had similar absorbance patterns. After the water was pre-treated, 100  $\mu\text{L}$  of 0.05M potassium iodate, 150  $\mu\text{L}$  of

6.85M hydrochloric acid, 150 uL of 0.0315M ammonium molybdate, and 100 uL of 0.0013M ethyl violet were added to the sample. The water sample was then allowed to sit for 30 minutes to ensure the reaction completed.

The reaction that drove the process was the reaction between ethyl violet ions and the molybdoarsenate ions, which created a blue color that could be spectroscopically detected at 612nm. Another concern with the process that was easily remedied was the issue with unreacted dye molecules that would interfere with detection. Morita and Kaneko found that excess H<sup>+</sup> ions would protonate the unreacted dye H<sup>+</sup> ions transferred a proton to the dye molecule so that a complex could form). The protonated dye molecules would then undergo a hydration reaction that ultimately resulted in conversion to colorless carbinol types. The method called for measuring the absorbance over time of the sample with the reagents and a reagent blank. The two absorbance curves were subtracted, resulting in an absorbance curve that remained constant for the duration of the measurement. Beer's law was used to analytically determine the concentration of arsenic in the water sample; Beer's law relates absorbance to the pathlength of the cuvette used to hold the sample in the photometer and concentration of the sample.

Appendix Slide 14 lists the chemicals and costs that are required for this method.

# By-product: Water

Phantom Eye will use two  
Ford 150-horsepower

2.3-liter (140-cubic-inch) 4-  
cylinder engines, fueled by  
hydrogen.

Takeoff weight is about  
9,800 pounds (4,450  
kilograms)



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So, let's revisit some old habits.

Here is a fragmented header, which we need to fix.

We also see a small picture (targeted visuals are good!) and some text to the side. But the text is small, and the speaker plans to talk about these items aloud anyway.

How can this be improved? What can make the most impact and support the main point?

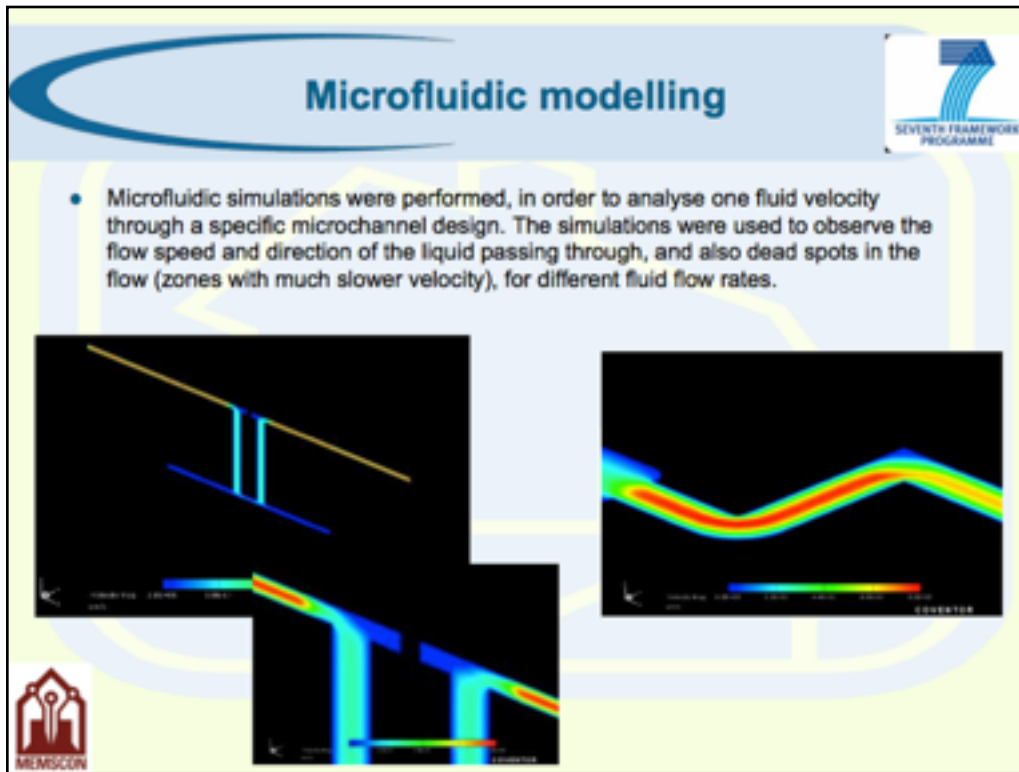


By reconsidering the main point (water), the speaker is able to hone the take-away message. And don't worry...those specs on the Phantom Eye are still available and easy to see in the Notes. We will get to that in a minute.

But the speaker here has completely made this into a JumboTron moment, where the visual is clean, simple, efficient. The audience will not be struggling to read small bulleted items while she speaks. Their attention will be completely on her, the subject matter expert. After all, that's why we gather for meetings, isn't it? To actually HEAR the experts talks?

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Photo courtesy Boeing.com



Let's workshop this one now. We start with a slide like this. Slides such as these is where many of us begin. We have a lot to say. We plo down a header. We know we need to explain ourselves, so we start writing. Oh! But there's visuals, too, so let's throw those in, too.

All of the ideas are correct, but it's how they are executed within the slideware tool that is incorrect. Thus, changes must be made to optimize the audience's experience AND the information contained in the slideware file.

1. sentence header
2. minimize text
3. maximize visuals
4. use notes

The next slide shows one way this could be done.

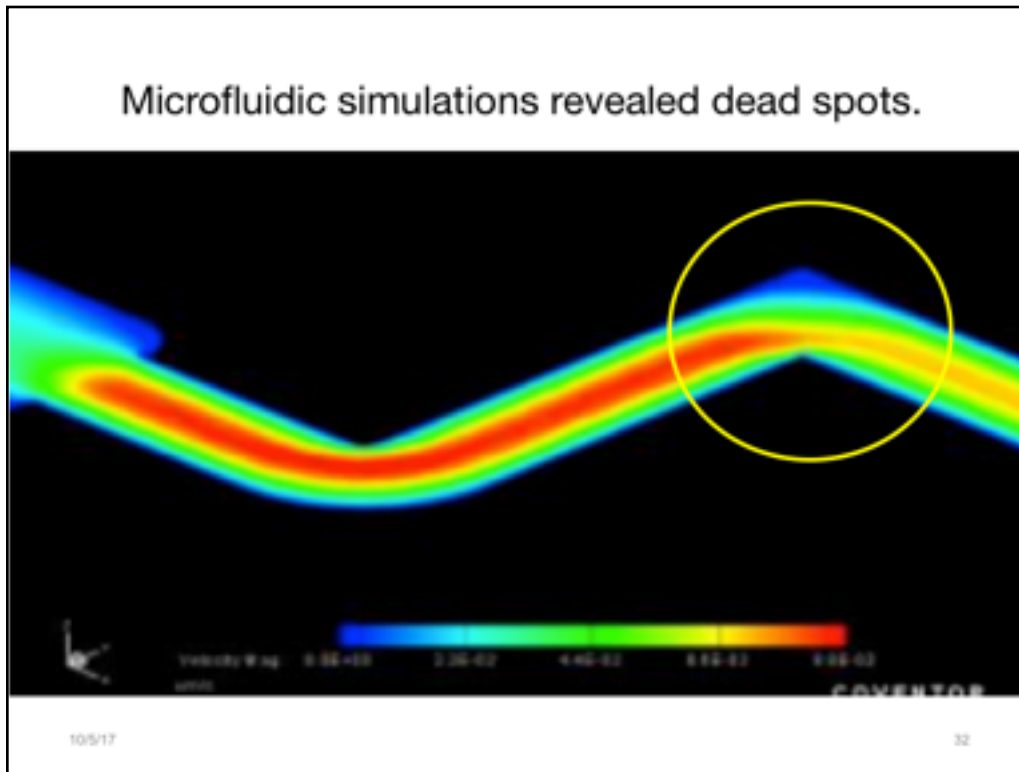
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Slide source:

Integrated MNT Platforms and Services :Europractice Service Project providing Development Platforms for Integrated Micro-Nano Technologies and Products.

Carmen Moldovan, Bogdan Firtat  
IMT-Bucharest





This revised version works better.

For the header, the main point has been pulled out of all of that text.

The most important visual has been magnified so that everyone in the room can see it.

And a circle has been imposed right upon the place where the technical expert all wants us to look.

NOTE: Using shapes is an important alternative to laser pointers. Shapes, arrows, and the like will archive; lasers do not.

The points are clear, concise, and well displayed.

But what about all of the other technical information that was in the original paragraph on the slide? What if someone might need that? (We will come back to that in a few minutes...)

----

Adapted from

**Integrated MNT Platforms and Services** :Europractice Service Project providing Development Platforms for Integrated Micro-Nano Technologies and Products.

Carmen Moldovan, Bogdan Firtat

IMT-Bucharest

**Organic  
contaminants  
are removed  
naturally.**

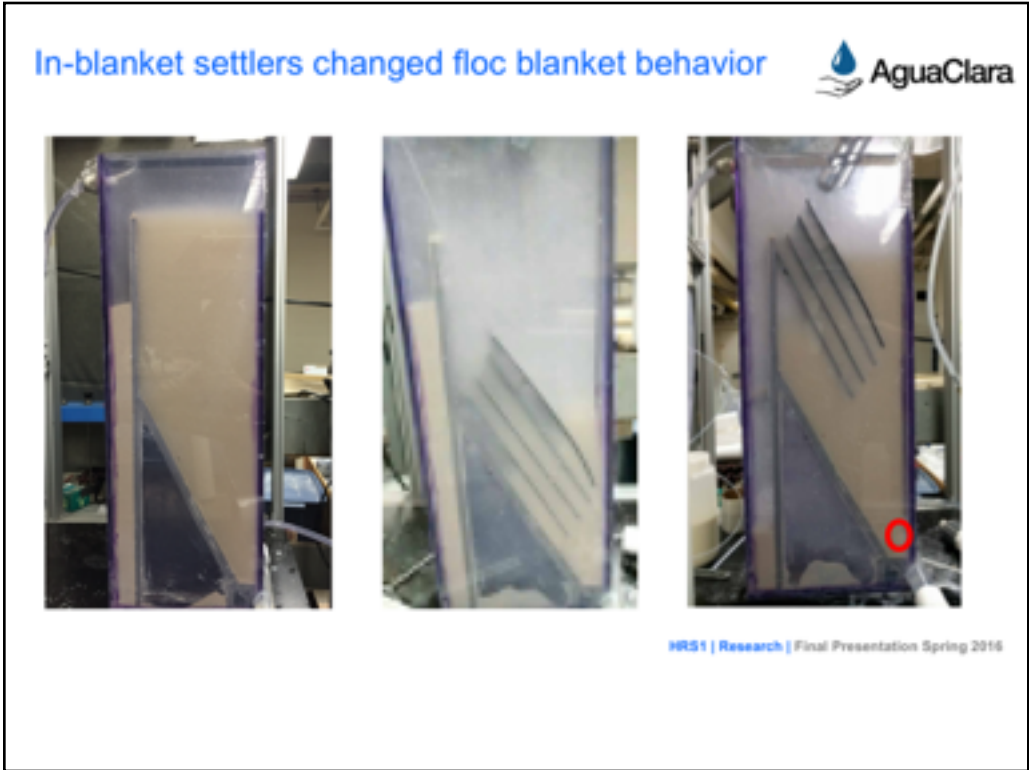


Now, let's return to this slide, where it's revised a bit.  
There's a strong sentence header.  
The photo is larger.  
And bullet points have been put into the Notes pane.

----NOTES---

- The schmutzdecke consumes and adsorbs/absorbs organic contaminants
- Layers of sand strain out particulate contaminants due to the small pores created by fine sand particles

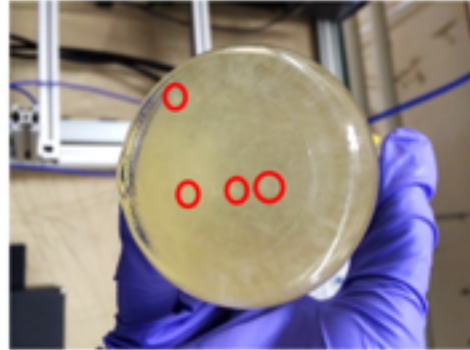
-----  
This revised version of the earlier slide show how to recast the header and emphasize the visuals for the audience. This simplicity in visual message will help keep the audience's attention on you, THE EXPERT!



Here's a great example! Good header, good pics.

From  
High Rate Sedimentation Floc Blanket  
Agua Clara Spring 2016

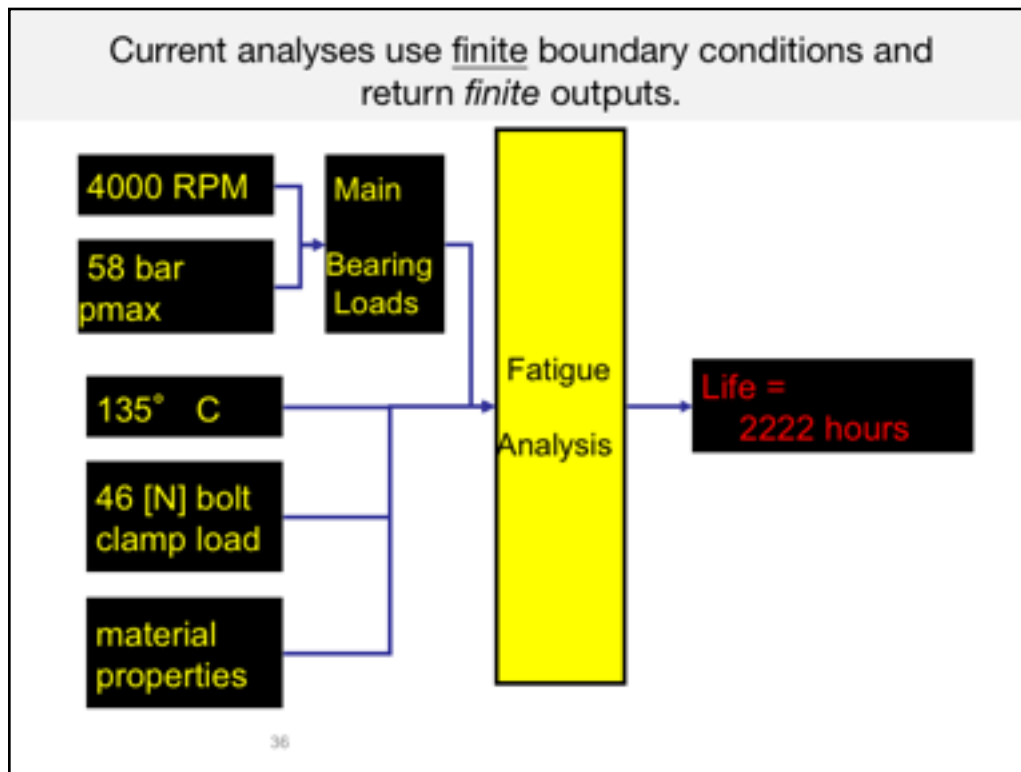
## Isolation of colony forming units only occurred in 5g gelatin



Microbiological Water Safety Monitoring Research | Final Presentation Spring 2016

And here is another good example from your Sping team.

Now, I stripped out some bullets from the left side. We'll see those return in a minute.



This example is a series of two slides from another graduate student in industry who was arguing for a change from the current analytical approach for life cycle analysis to a more realistic, and statistically reliable approach using very different methods. Instead of bulleting his statements as a traditional slide design would do, he showed the inputs and outputs dynamically as a very memorable process for his audience to take away from his talk.

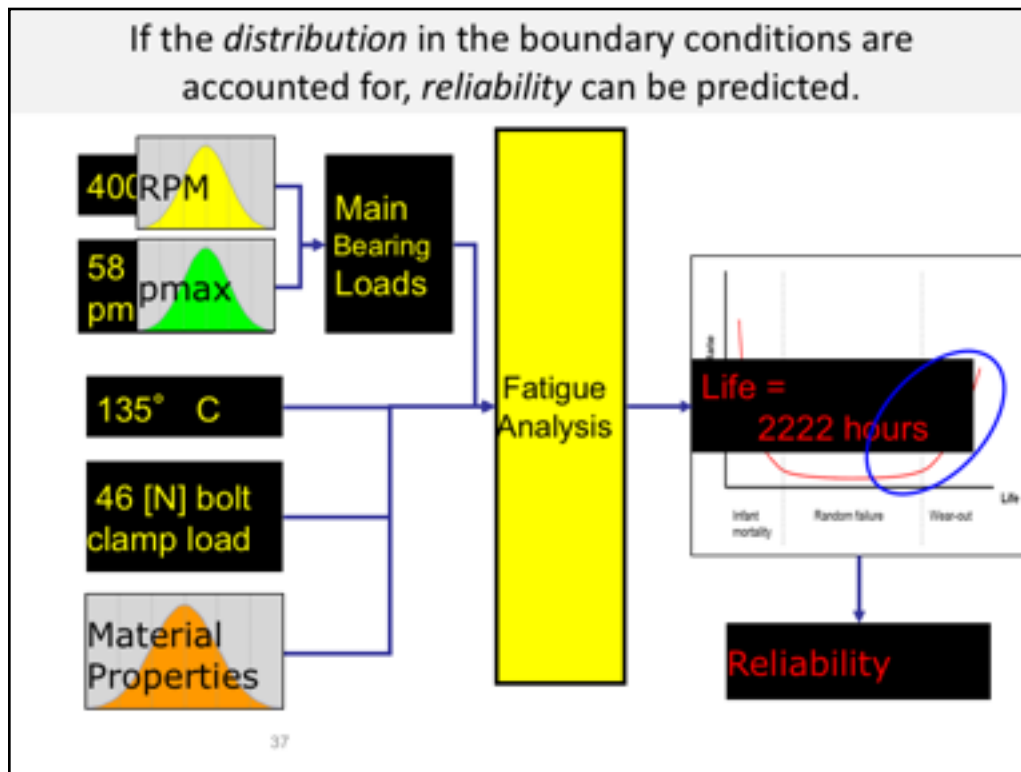
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#### **Content Notes from the original engineering speaker:**

The reason that it's hard to quantify the built-in safety factors is because our analyses use finite boundary conditions.

For example....

And return a finite output.



Because of the way he has used animations and visual objects to tell the story of his argument, we get a much more clear, complex, and contextualized view of what he is arguing for here.

-----  
**Content notes for original presenter:**

But if we could somehow account for the statistical distribution in the boundary conditions, we could calculate reliability instead of a safety-factor (or a fatigue life like my example has).

So, by replacing the finite values of the most important boundary conditions, we can forecast the failure rate – the right side of a bathtub curve.

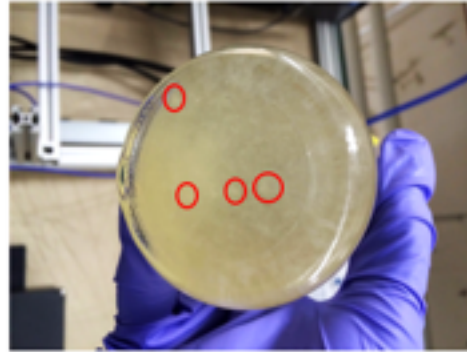
And that is directly related to reliability.

The end result is actually a plot of reliability over time.

## Isolation of colony forming units only occurred in 5g gelatin



- Control and 1g gelatin were similar
- 2.5g gelatin: thicker layer but no isolation
- CFUs-colony forming units



Microbiological Water Safety Monitoring| Research | Final Presentation Spring 2016

We return to this slide, and in action, those bullets on the left come in one by one at the PRECISE moment they are needed, and not before. We can also pop in the red circles one by one, as needed.

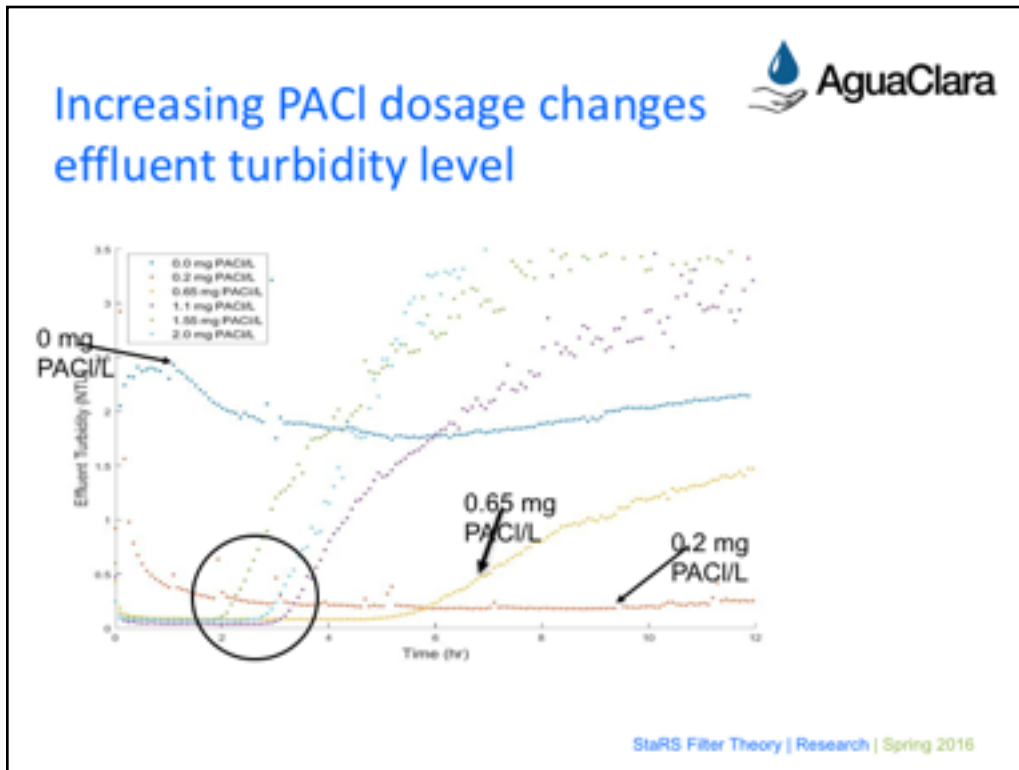
--NOTES----

The bottom of the 5g jar has distinguishable CFUs as some are circled in red. These kinds of colonies could not be observed in the other samples.

-----

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Slide source: Microbiological Water Safety Detection  
Agua Clara Spring 2016



This spring team brought in the arrows and circle one by one, as needed. Below, I left in the team's original set of notes, too, which will take us nicely into our next point about using Archival Notes.

-----

Jonathan

Here is a zoomed in look at the effluent turbidity that looks at the first 12 hours of filtration

-0 was a control experiment

Without PACl, the filter immediately failed.

As PACl was added, it decreased the effluent turbidity

As more PACl is added, the filter began to fail quicker

After 24 hours of filtration, the 0.2 mg PACl/L failed after 10 hours

After about 6 hours of filtration, the 0.65 mg PACl/L failed

1.1, 1.55, 2.0 mg PACl/L all failed in under 4 hours



# 3

## Archival Notes



I borrowed this slide from another agency's water project. The speaker had the picture just like, this...very big and corner to corner. It's a good photo and I think the idea of making it very large is a great idea. However, what happens with a slide like this if someone misses the meeting and can't hear the speaker?



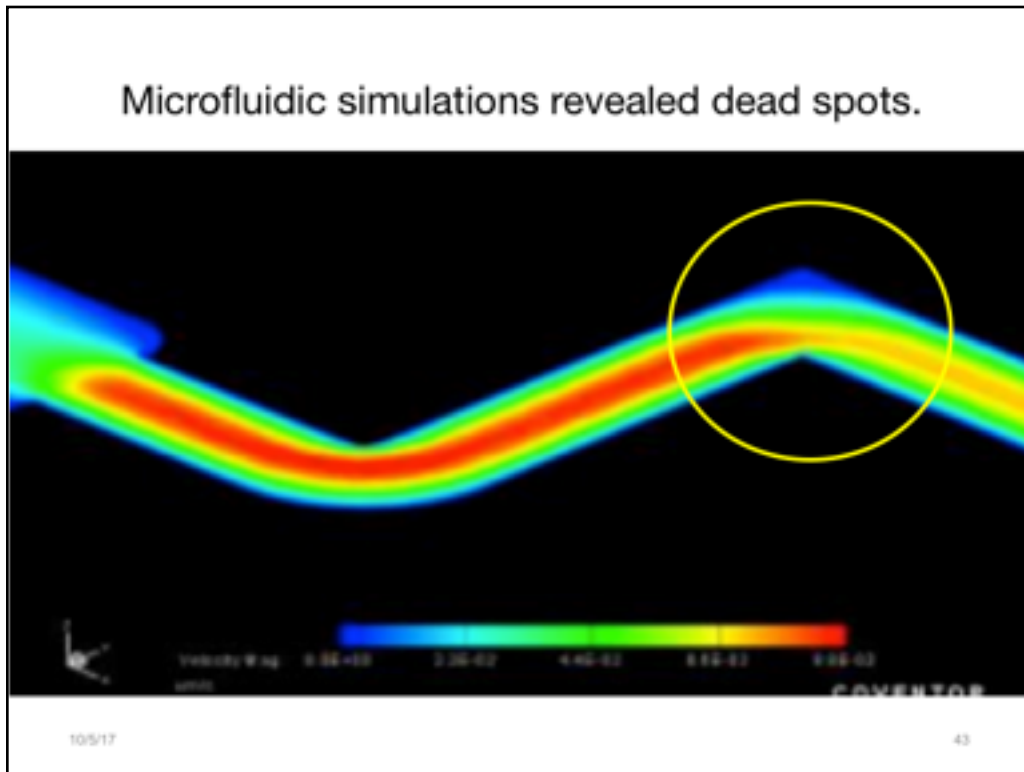
Click to add notes

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If we are lucky, the speaker has inserted notes. Alas....not this speaker. So, once this slide is sent to someone who has missed the meeting, the information collapses. It's gone.

The solution is to use the Notes pane to your advantage.



Remember when we were worried about all of the other technical information that was in the original paragraph on the slide? What if someone might need that?

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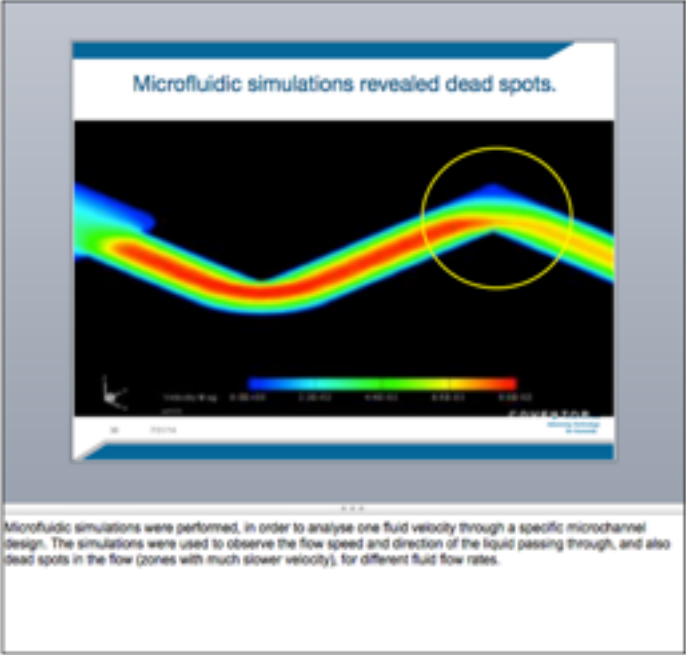
Adapted from

Integrated MNT Platforms and Services :Europractice Service Project providing Development Platforms for Integrated Micro-Nano Technologies and Products.

Carmen Moldovan, Bogdan Firtat

IMT-Bucharest

It's all right there, in the Notes.



Microfluidic simulations revealed dead spots.

Microfluidic simulations were performed, in order to analyse one fluid velocity through a specific microchannel design. The simulations were used to observe the flow speed and direction of the liquid passing through, and also dead spots in the flow (zones with much slower velocity), for different fluid flow rates.

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Remember when we were worried about all of the other technical information that was in the original paragraph on the slide? What if someone might need that info?

**It's all been transferred into the Notes pane.**

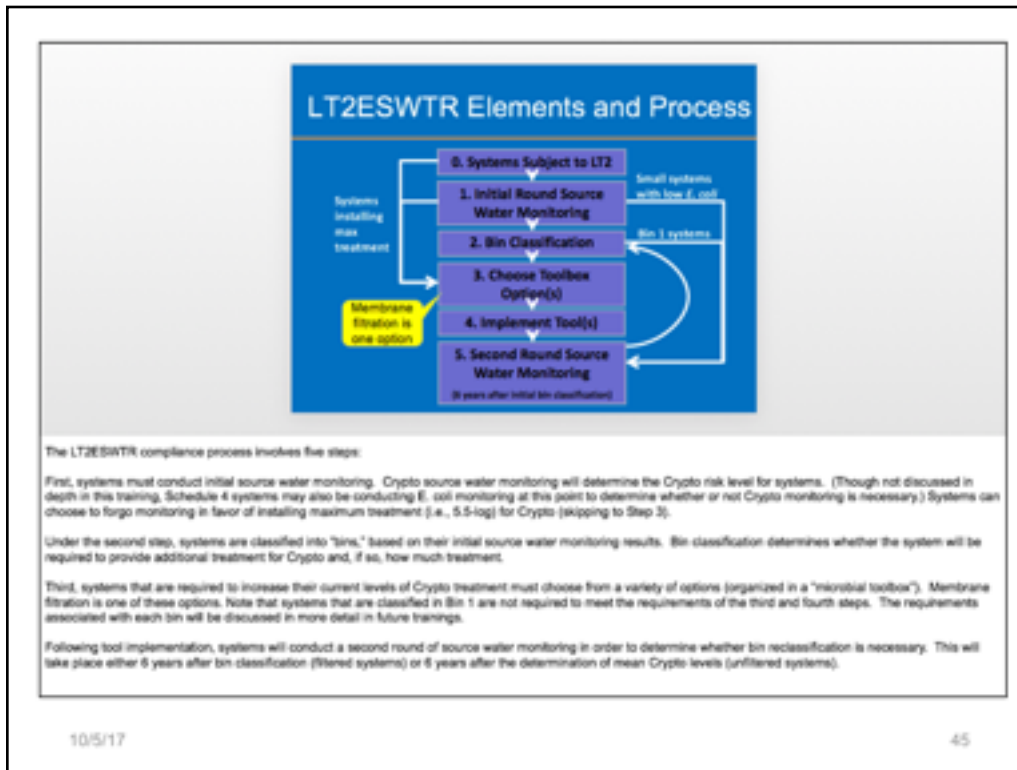
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Adapted from


Integrated MNT Platforms and Services :Europractice Service Project providing Development Platforms for Integrated Micro-Nano Technologies and Products.

Carmen Moldovan, Bogdan Firtat

IMT-Bucharest



Admittedly, I'm not thrilled with much about this slide at all. There's no sentence header, the entire flow chart came in at the same time (too much info at once). However, I WAS impressed with the wonderful use of the Notes pane to elaborate on the point. Do this.



## We are pursuing an alternative and more promising method.

- Utilized reaction between dissolved arsenic, ammonium molybdate, and ethyl violet to determine arsenic concentration.
- The method provided quantitative and qualitative results.
- The spectroscopic detection limit was 4 µg/L of Arsenic, well below EPA standards of 10 µg/L.



0 25 50 100 200 µg/L



[Archie Bevan | Research | Corporation Presentation Spring 2017](#)

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**Speaker:** Kevin Juan

**Source for EPA standards:** <https://www.epa.gov/bemg/fifo/chemical-contaminant-rules>

**Figure 1:** Treated solutions of various concentrations of arsenic contaminated water, showing qualitative effectiveness of the procedure.

**Figure 1 Source:** Morita, K. and Kaneko, E. (2008). Spectrophotometric Determination of Arsenic in Water Samples Based on Micro Particle Formation of Ethyl Violet-Molybdate. *Analytical Sciences*, 22(8) 1085-1088.

The other method considered was developed by Morita and Kaneko, which utilized the reaction between dissolved arsenic, ammonium molybdate, and ethyl violet to determine arsenic concentrations spectroscopically in 50-mL water samples. One of the stipulations of the process was that the raw water be treated with 1 mL of 2.1M  $\text{pH} \approx 7.0$  buffer ( $\text{pH} \approx 7.0$ ) and passed through a column containing an anion exchange resin. The purpose of this step was to remove phosphates from the water that would otherwise interfere with the detection of arsenic as the two compounds had similar absorbance patterns. After the water was pre-treated, 100 µL of 0.05M potassium iodate, 150 µL of 6.85M hydrochloric acid, 150 µL of 0.015M ammonium molybdate, and 180 µL of 0.0015M ethyl violet were added to the sample. The water sample was then allowed to sit for 30 minutes to ensure the reaction completed.

The reaction that drove the process was the reaction between ethyl violet ions and the molybdate ions, which created a blue color that could be spectroscopically detected at 612nm. Another concern with the process that was easily remedied was the issue with unreacted dye molecules that would interfere with detection. Morita and Kaneko found that excess  $\text{H}^+$  ions would protonate the unreacted dye  $\text{H}^+$  ions (transferred a proton to the dye molecule so that a complex could form). The protonated-dye molecules would then undergo a hydration reaction that ultimately resulted in conversion to colorless carbonyl types. The method called for measuring the absorbance over time of the sample with the reagents and a reagent blank. The two absorbance curves were subtracted, resulting in an absorbance curve that remained constant for the duration of the measurement. Beer's law was used to analytically determine the concentration of arsenic in the water sample. Beer's law relates absorbance to the pathlength of the cuvette used to hold the sample in the photometer and concentration of the sample.

Appendix Slide 14 lists the chemicals and costs that are required for this method.

Returning to this AguaClara example...LOOK AT THOSE AMAZING NOTES! This shows how professionalism looks.

Source:

Constant Head Tank

Agua Clara Spring 2016



**We are pursuing an alternative and more promising method.**

- Diluted reaction between dissolved arsenic, ammonium molybdate, and ethyl violet to determine arsenic concentrations.
- The method provided quantitative and qualitative results.
- The spectrophotometric test was 7 µg/L of Arsenic, with below 0.05 standards of 20 µg/L.



0 20 50 100 200 µg/L

**Speaker Kevin Ivan**

Source for EPA standards: <https://www.epa.gov/health/chemical-contaminant-table>

Figure 1. Treated solutions of various concentrations of arsenic contaminated water, showing qualitative effectiveness of the procedure.

Figure 2. Source: Morita, K. and Kawabe, S. (2016). Spectrophotometric Determination of Arsenic in Water Samples Based on Micro-Particle Formation of Ethyl Violet-Molybdenum. Analytical Sciences, 32(8) 1046-1048.

The other method considered was developed by Morita and Kawabe, which utilized the reaction between dissolved arsenic, ammonium molybdate, and ethyl violet to determine arsenic concentrations spectrophotometrically in 50 mL water samples. One of the stipulations of the procedure was that the raw water be treated with 1 mL of 0.2M Bis-Tris buffer (pH=7.2) and passed through a column containing an anion-exchange resin. The purpose of this step was to remove phosphates from the water that would otherwise interfere with the detection of arsenic as the two compounds had similar absorbance patterns. After the water was pre-treated, 100 µL of 0.05M potassium iodate, 150 µL of 0.05M hydrochloric acid, 100 µL of 0.0025M ammonium molybdate, and 100 µL of 0.0025M ethyl violet were added to the sample. The water sample was then allowed to sit for 30 minutes to ensure the reaction completed.

The reaction that drove the process was the reaction between ethyl violet ions and the molybdoarsenate ions, which created a blue color that could be spectrophotometrically detected at 612nm. Another concern with the process that was easily remedied was the issue with unreacted dye molecules that would interfere with detection. Morita and Kawabe found that once the ions would

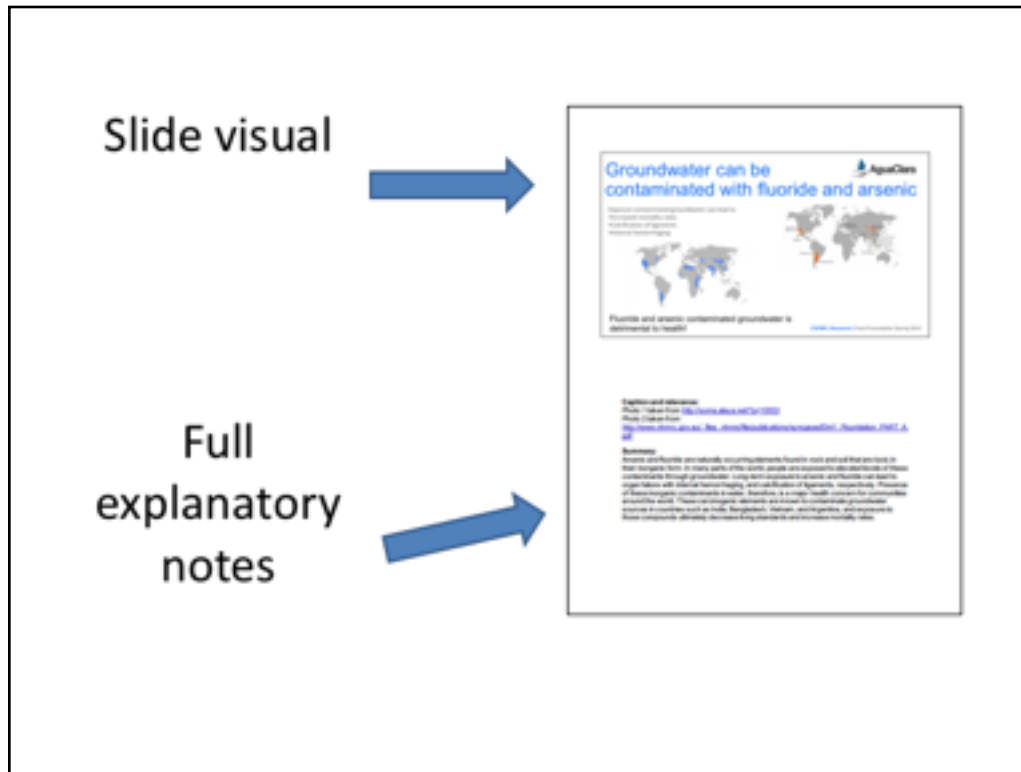
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Send as a PDF that shows the Notes.

Using the Notes like makes the slides into amazingly rich archival pieces for future users, future teams, clients, outreach, and so forth. It documents your work thoroughly.





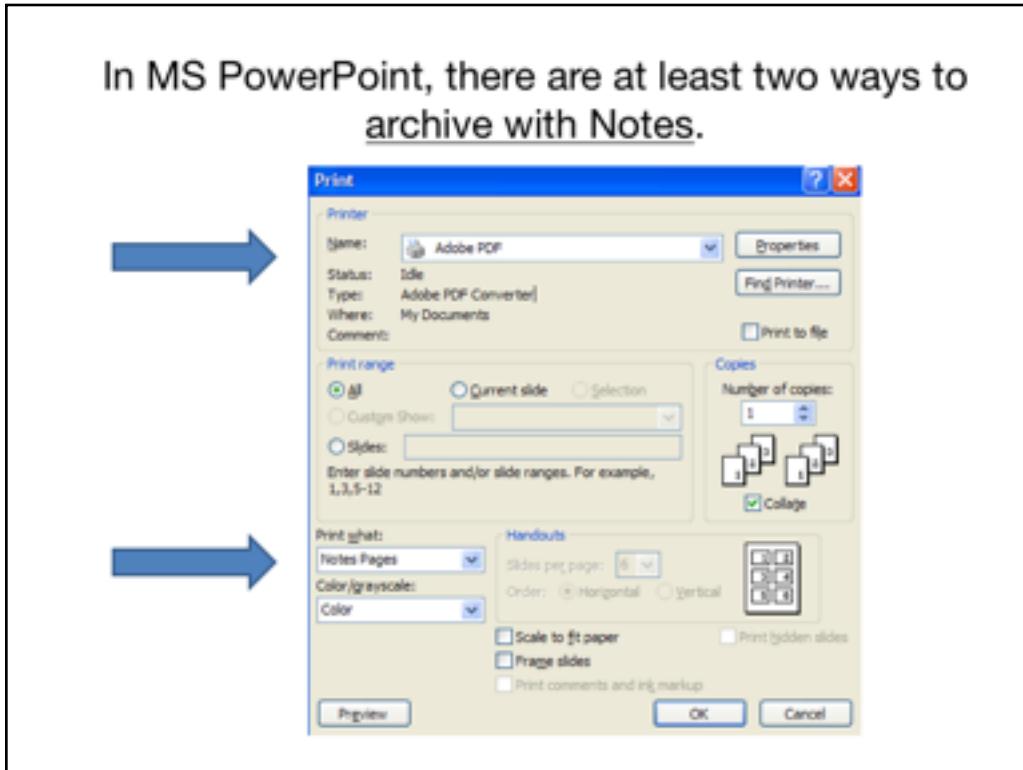
When someone asks you to “just send the slides,” print them as a PDF with Notes.

As an outcome, your PDF pages will look like this, with the slide at the top and the notes below.

Using this method actually makes your slide deck more complete, whether as a script for you, as archives for an organization, or as notes for a class.

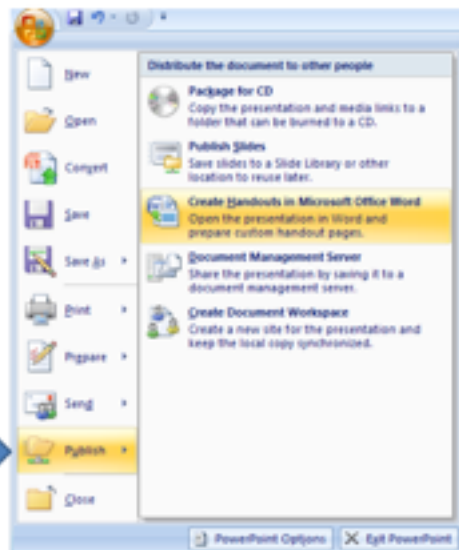
This is a nice example of a spring 2016 using the Notes pane for a Summary AND for citing their sources.

In MS PowerPoint, there are at least two ways to archive with Notes.

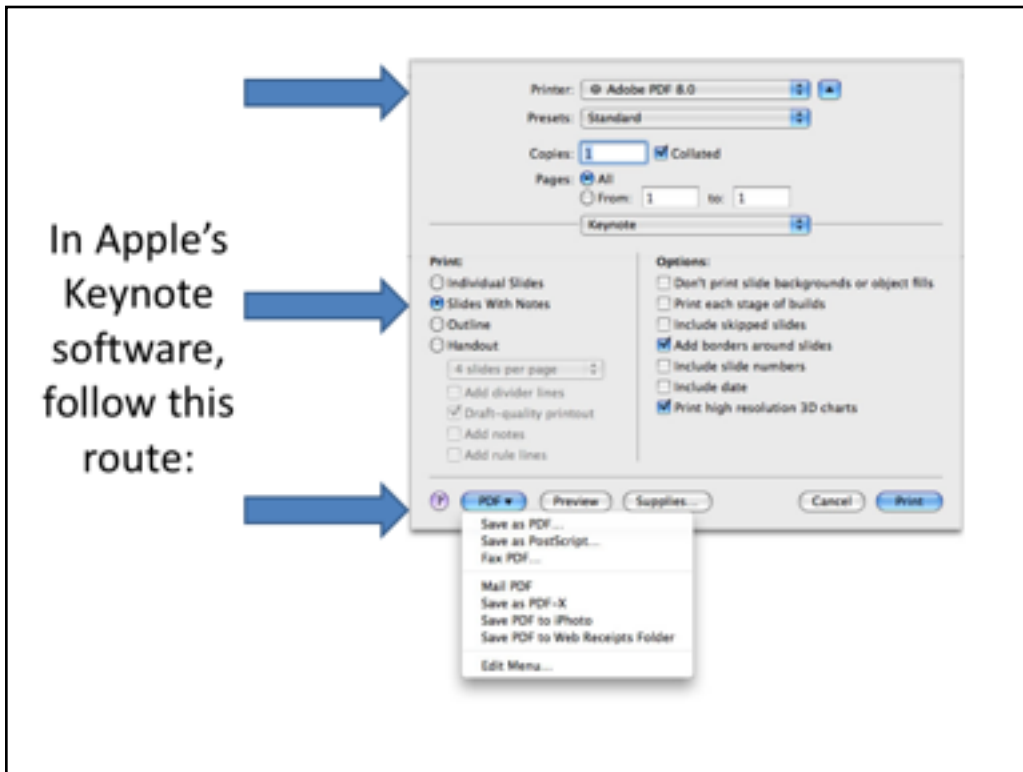


In PowerPoint, choose PRINT. Then choose to print to PDF, making sure that you indicate that you desire NOTES PAGES as the format.

2. Use the converter in the new MS Office Suite.



If you are using the newer Microsoft Suite, the path is slightly different. Choose PUBLISH then CREATE HANDOUTS.



In Apple's Keynote, after choose PRINT, be sure to choose PDF, SLIDES WITH NOTES, and then SAVE AS PDF.

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It's often better, especially if you are using webinar software to teams at a distance, to build your layers out over several slides instead of cramming them all onto one slide. Yes, the slide deck gets longer, but it takes NO additional time to cover the same information. Plus it archives better and avoids problems once printed or viewed via PDF.

Sentence Headers

Optimized Visuals

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Three simple changes will enrich  
the entire technical endeavor.

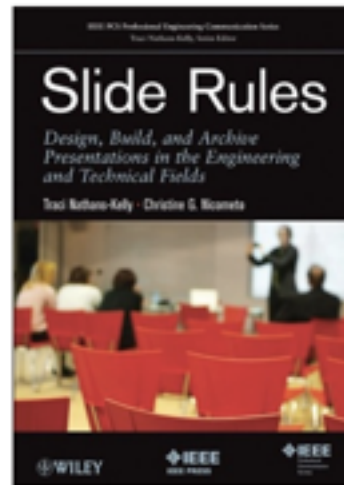
Your stance as  
a subject matter expert  
will be very apparent.



Apply your expertise  
and innovative thinking  
towards  
engineering communication  
practices, too.

Time permitting, let's  
talk now.

Traci Nathans-Kelly  
[nathans-kelly@cornell.edu](mailto:nathans-kelly@cornell.edu)



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This is a book that I wrote, focused entirely on how slide decks can enhance your technical endeavors. It covers many more issues that I have been able to address here today.