EPD is implementing a department-wide initiative to update and refresh all of its materials.

This is for several reasons:

•To create and sustain an EPD and UW brand that is easily recognizable to the world

•To systemize and simplify processes

•It allows clear communication and a unified voice, rather than confusing consumers with multiple interpretations that can be in conflict.

•It provides instant recognition, a way to immediately differentiate the College of Engineering at UW-Madison from an engineering enterprise at any other college or university.

•It strengthens the college's reputation and demonstrates a common mission, a message of "we're all in this together."

•It makes a positive association with UW-Madison, leveraging the recognition and feelings of goodwill for the university as a whole among the college's key constituencies.

•It helps to avoid duplication of effort, allowing the college to perform efficiently and economically during a time when these traits are essential.

•It protects the college's brand equity, safeguarding the concrete value of its work from financial or other gains by external groups.

Part of these efforts include a move towards more pedagogically sound uses of presentation slides. This short video is an introduction to those sound educational practices with some suggestions on how to implement them into your EPD course slides, notes, course materials, and notebooks.

These examples are all slides from various EPD short courses. We can see the wide variety of approaches to making the slides. And while nothing is intrinsically wrong with having a variety of approaches, EPD is moving away from such wide variation towards more stable and predictable delivery processes. This includes how we use our slide decks as course materials.

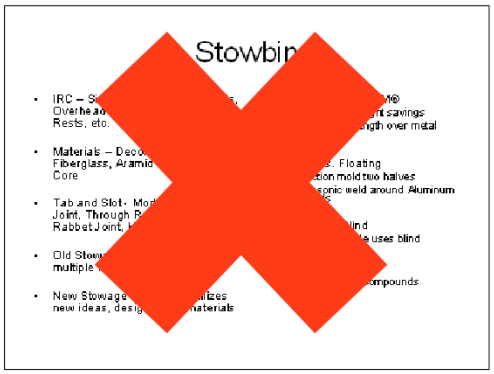
EPD's goal is several-fold, but we want to emphasize here three things:

1. We need to stabilize our visual message to our clients and students.
2. We need to create efficient processes for creating and disseminating course materials.
3. We need to use pedagogically sound methods to teach our clients and students.

We do not intend to have lock-step templates that everyone MUST use. Rather, EPD will provide the basic building blocks that will enable you to create new course materials or revise old ones so that they convey the EPD message while conveying your technical information in the best possible manner.

## The old ways are not the most sound.

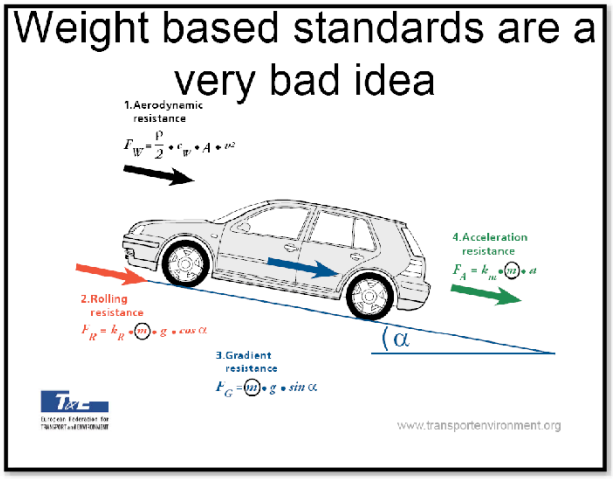
**Traditional model =**




Herein, we are going to give you some basic guidelines about slide creation. As well, we will provide you with some new methods, grounded in research about learning, that will aid you in creating better slides that will reach your audience more readily.

There are several objectives
to be covered herein.

**New model =**



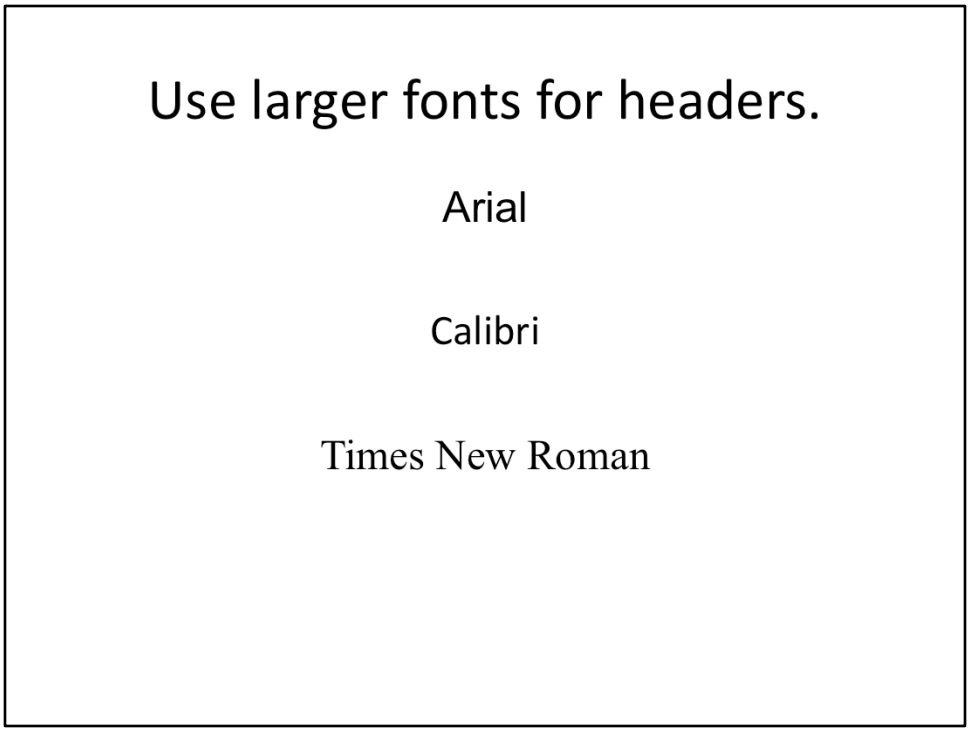

Better slides can markedly aid audience retention, display your message more clearly, and create sets of notes that have more meaning for your audience.

This module will reveal several techniques that can increase information retention by audience members.

Let's start with some basics.

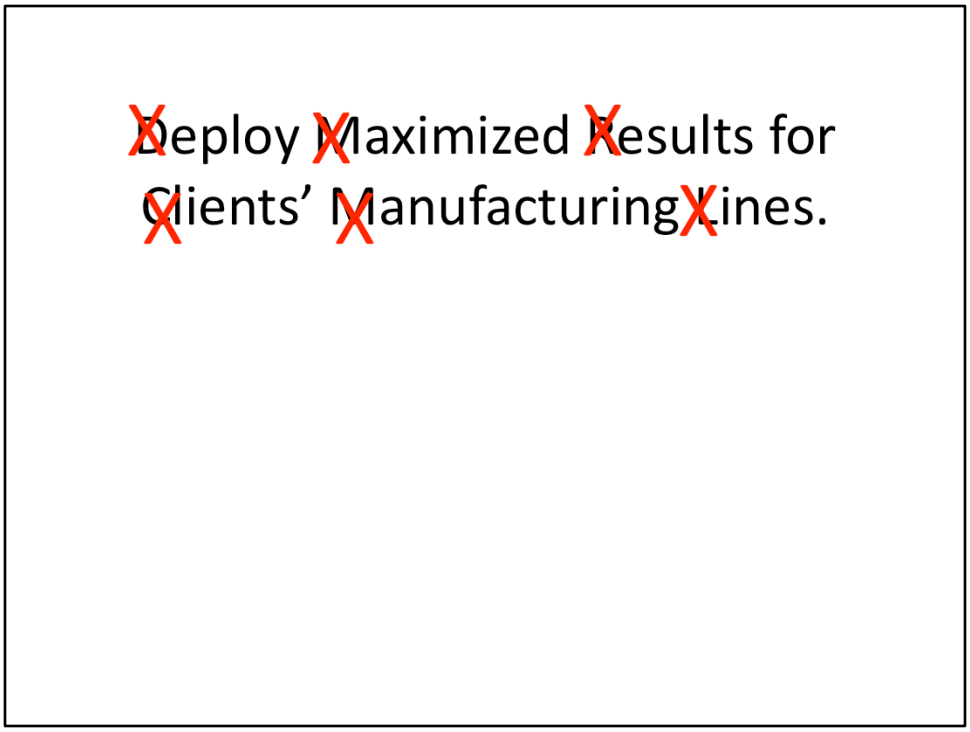
First, EPD will provide to you a library of basic templates that you can use along with a style guide (forthcoming).

Please be sure to use one of the opening slides that EPD provides, adding in your relevant course information. You can also put a company logo on the first and last slides of your talk, but please refrain from using those logos in the body of the slide deck.




When you create your headers, be sure that your fonts are of a substantial size. Try for 32pt font as a general guideline.

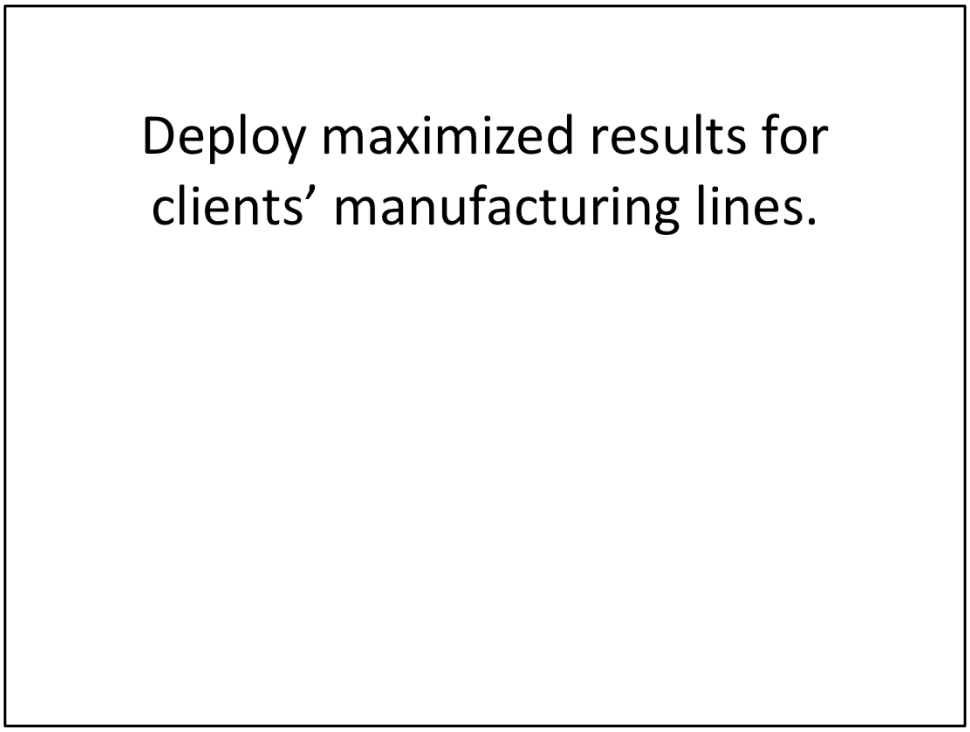
Stay with these basic default fonts, as they will translate easily into a variety of delivery platforms without distortion.




When writing your headings, avoid all caps.

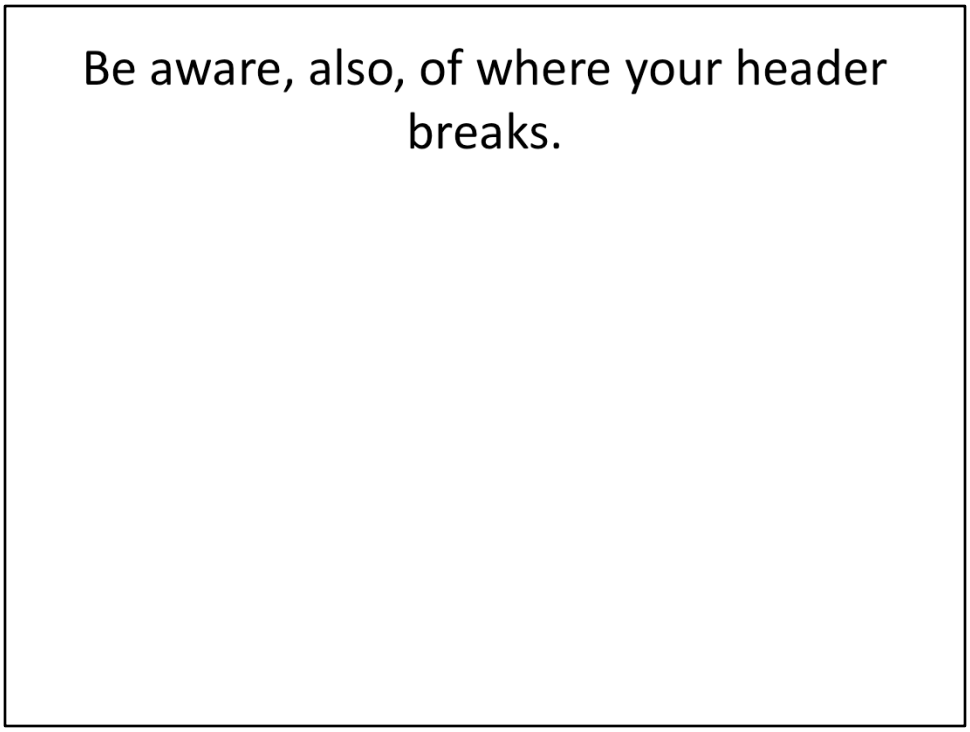
Remember, too, to use regular capitalization practices. There is no need to use "billboard" capitalization practices.

Using odd capitalization practices actually *decreases* readability for your audience. Instead…

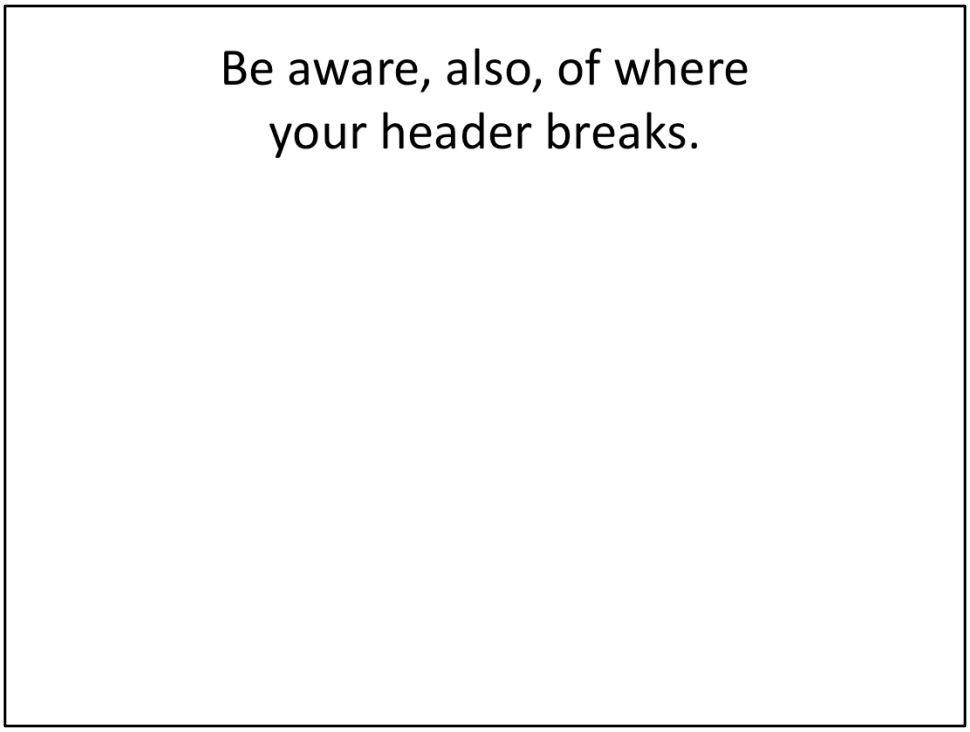



…use regular sentence capitalization.

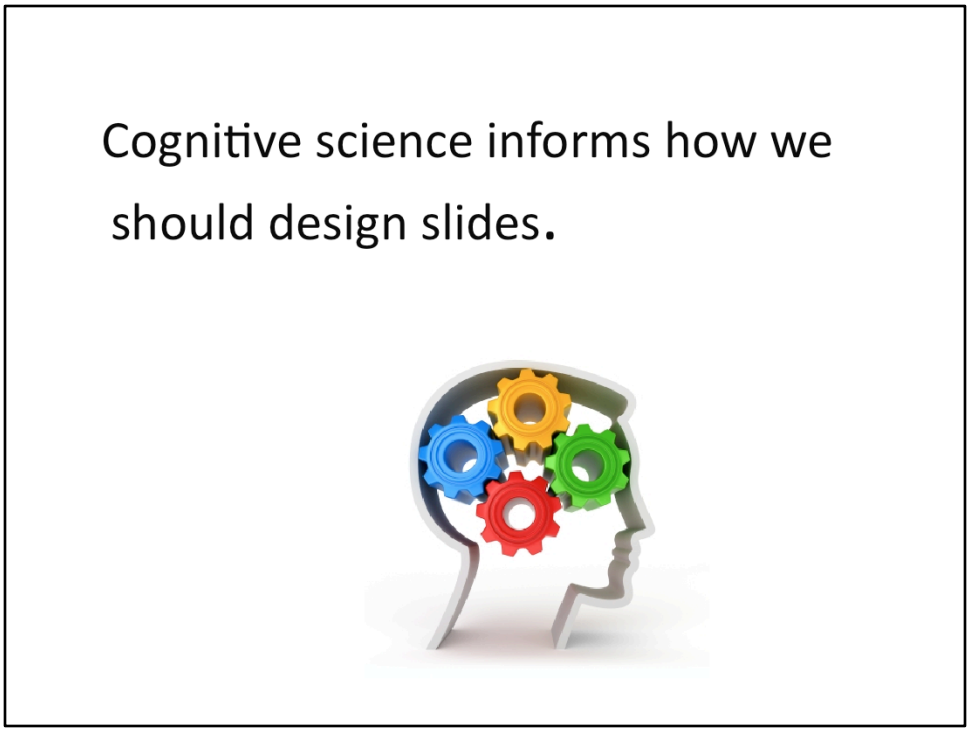
For headers, you can choose to include punctuation or not. Just be consistent in your approach.




When you are crafting your headers, aim for a visual balance. In this example, the word “breaks” seems like an after thought.

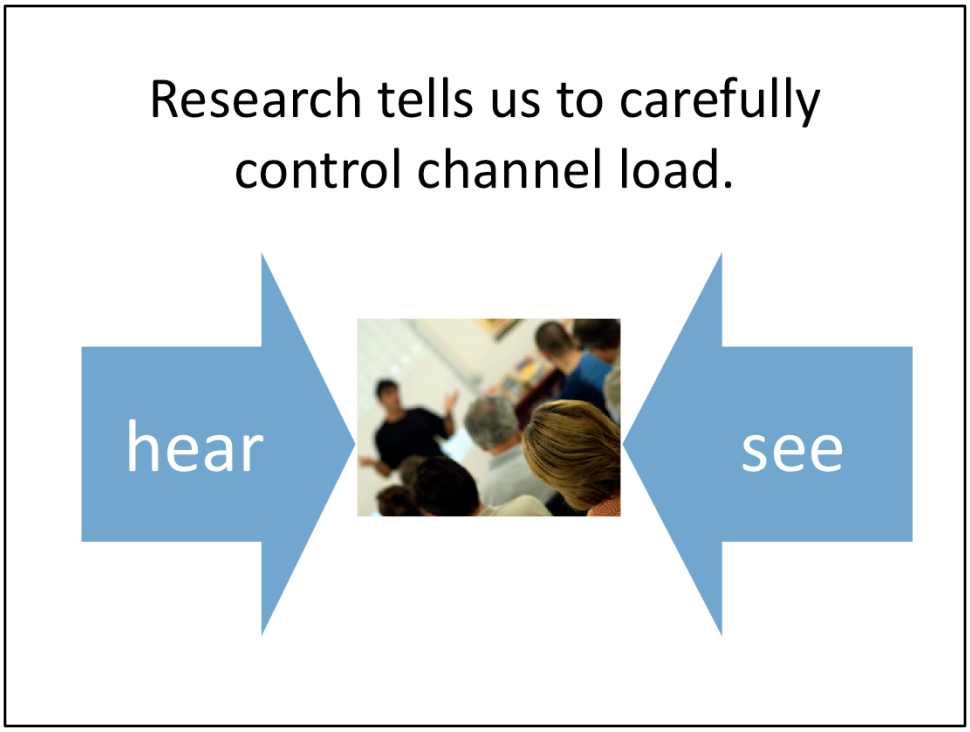



Instead, make a deliberate break in your header for added emphasis and ease of reading.




So let's look at how recent science affects the way we should be working with our slides.

In recent years, cognitive psychology has taught us a great deal about the ways our brains use, adapt, and learn from various forms of multimedia. Much of this work was pioneered by Dr. Richard Mayer from UC Santa Barbara and informs several of the methods that we will be discussing. The most significant finding we can take from Mayer's work involves the concept that we have limited capacity in verbal and visual channels. For example, if we are being both talked to and simultaneously trying to read information, our comprehension and retention of concepts from either the talk or the text is going to be extremely limited. In order to manage the cognitive load for optimal comprehension and retention, we must limit the amount of information pushed through each channel.




For presentation planning, this cognitive framework gives us clear design guidelines:

We must limit our use of text on slides and make better use of easier, visual cues and devices that are better comprehended and retained by our audiences.

Specifically, we want to avoid making our audiences struggle to decide whether to listen or read during our presentations. This is true for both face to face talks, webinars, and captured video.

# Targeted planning is essential.

Sustainable Development: Opportunities for Environmental Engineering
**Patrick Eagan PhD., P.E.**
**Professor**
**Engineering Professional Development**
**University of Wisconsin-Madison**

Learning Objectives:
The **global** aspects of Sustainability and why I should care?
How it affects your infrastructure, risk, energy and material choices.
What are some tools available to evaluate the "effector" LCA
I am not trying to change your lifestyle

There are many dimensions to Sustainability
New Frameworks—Metrics
Consumption aspects
Opportunity and innovation
Design for the Environment/Design for Sustainability
Historical social context
Other related(?) crisis; (poverty, crime, education, religion, intergenerational equity)

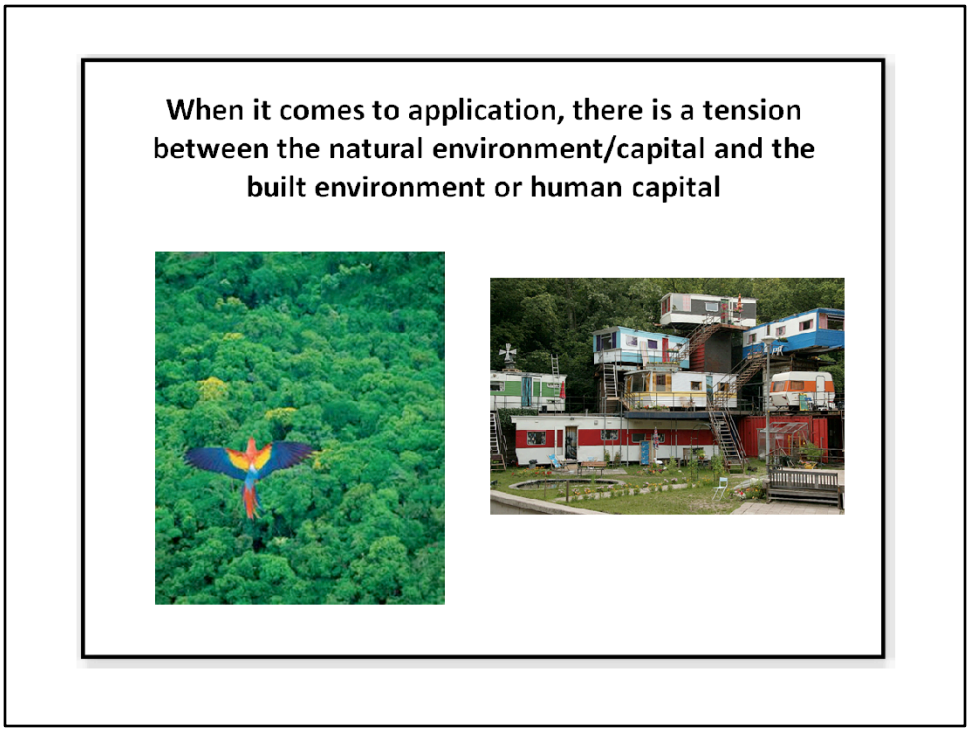
Terminology is an important aspect of understanding value
Sustainability, Sustainable development, Nachhaltigkeit
Ecodesign and Design-for-the-environment
Product Lifecycle Management; Lifecycle Thinking; Systems Thinking
Sustainability and Green and Environmental
**The terms may change but the concept is useful. What is Green?**
Green Wash
Natural vs Organic
Less bad
Waste assimilation
Resource limitation
This topic is a work in progress so we need a Disclaimer
**We don't have all the answers.**
**We often know what is not sustainable rather than what is sustainable!!**

What is Sustainability and why should I care?

**When it comes to application, there is a tension between the natural environment/capital and the built environment or human capital**
For most professionals we just see disconnected dots

**How does Sustainability support business decisions/Profitability?**
**Cost reduction**
**Energy/Water/Raw Material usage**
**Risk Reduction**
**Compliance**

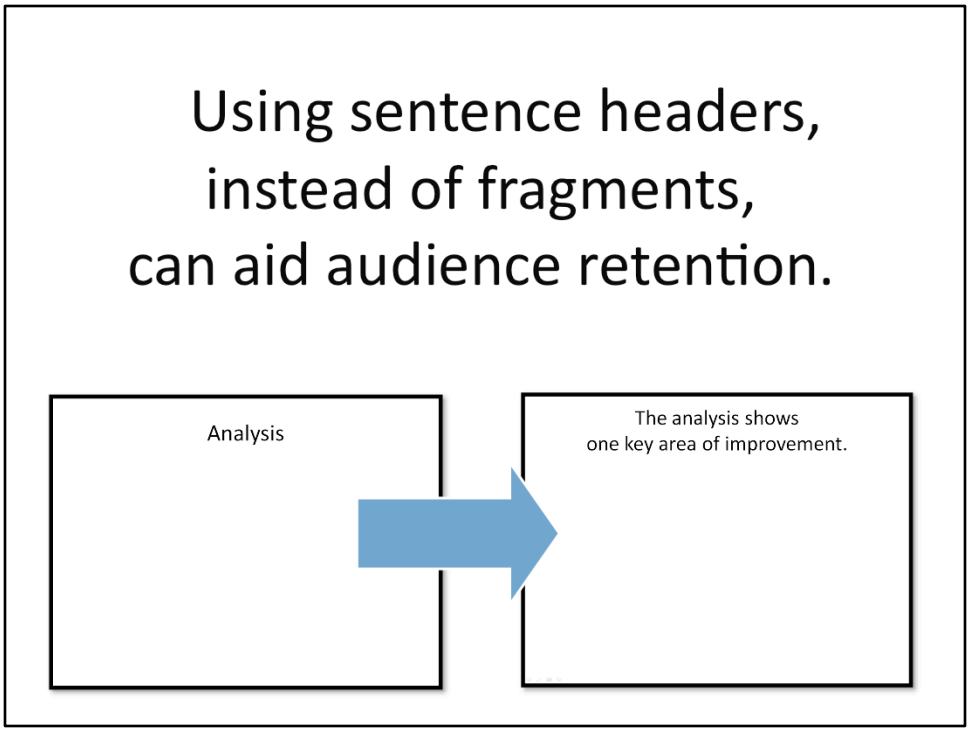
As we all know, a good talk starts with targeted planning. Begin with a thorough outline of the presentation's main ideas.




When you begin creating your slides, plan to focus on ONE main idea per slide.

Then, as you begin to craft your talk more fully, implement some of the following best practices for a stronger talk.

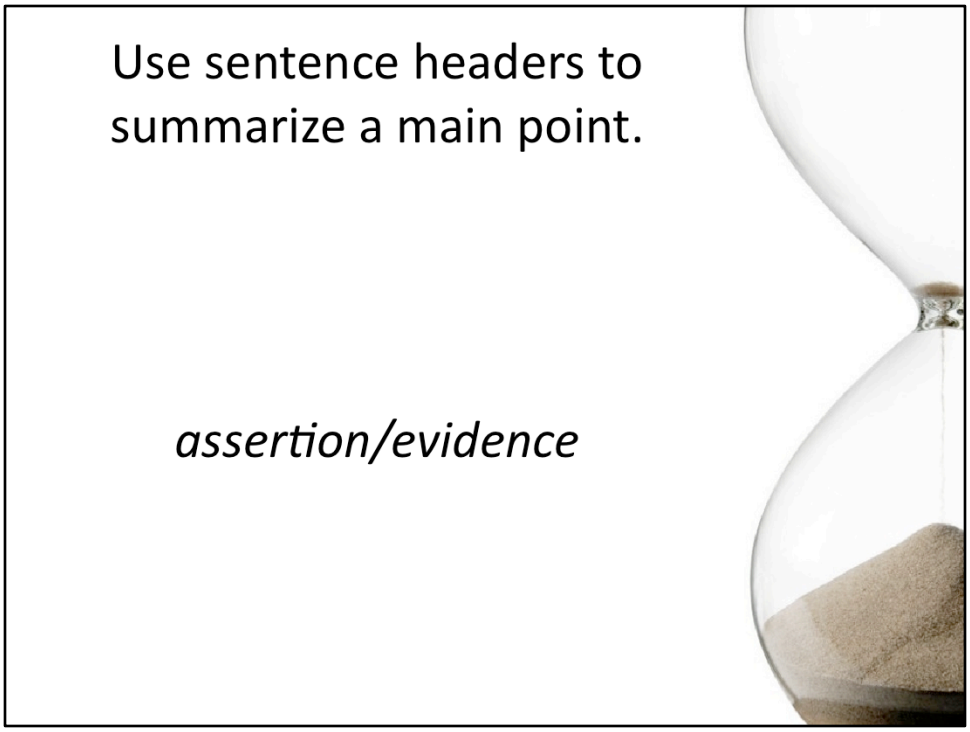
Slide Source:
Eagan, P. (2010). Sustainable development: Opportunities for environmental engineering. Engineering Professional Development, College of Engineering, University of Wisconsin-Madison. Lecture.




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.

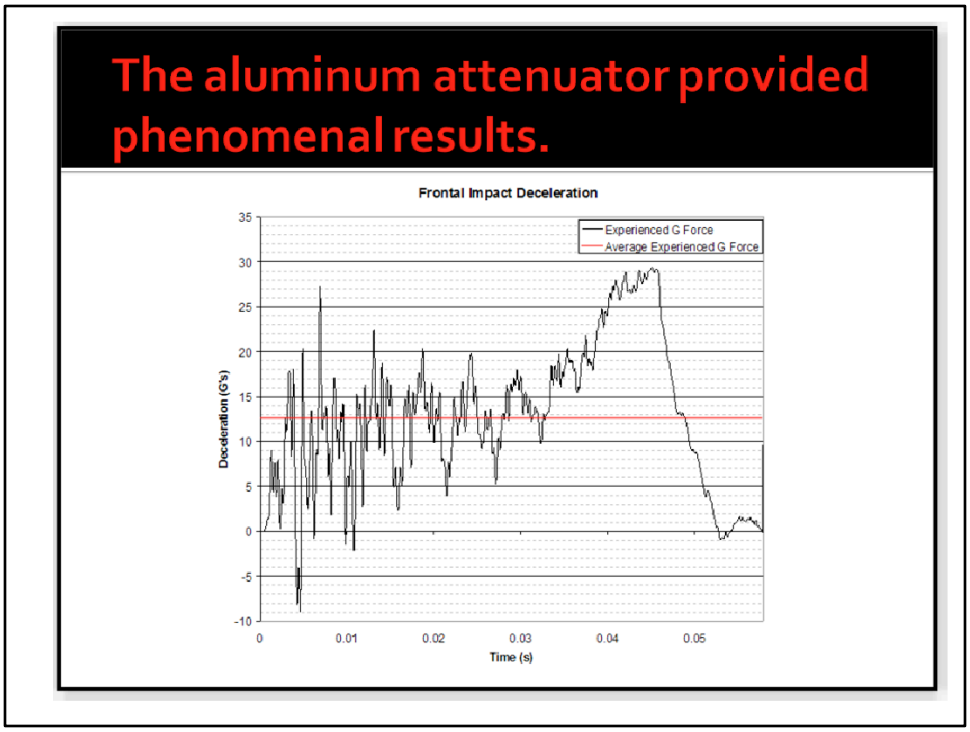
Without having to struggle to fill in the blanks in your thinking, your audience will be better able to retain the information and ideas you are presenting. In addition, your assertions will leave little doubt in your audience's mind as to the direction of your presentation.




Another benefit of using complete sentence headers is that they provide both the live audience, but also any audience members who may view the slides as an archive piece later, with a complete summary of the main points presented in the talk. In this way, they can more quickly draw your audience to the main points of your talk – saving everyone valuable time and effort.

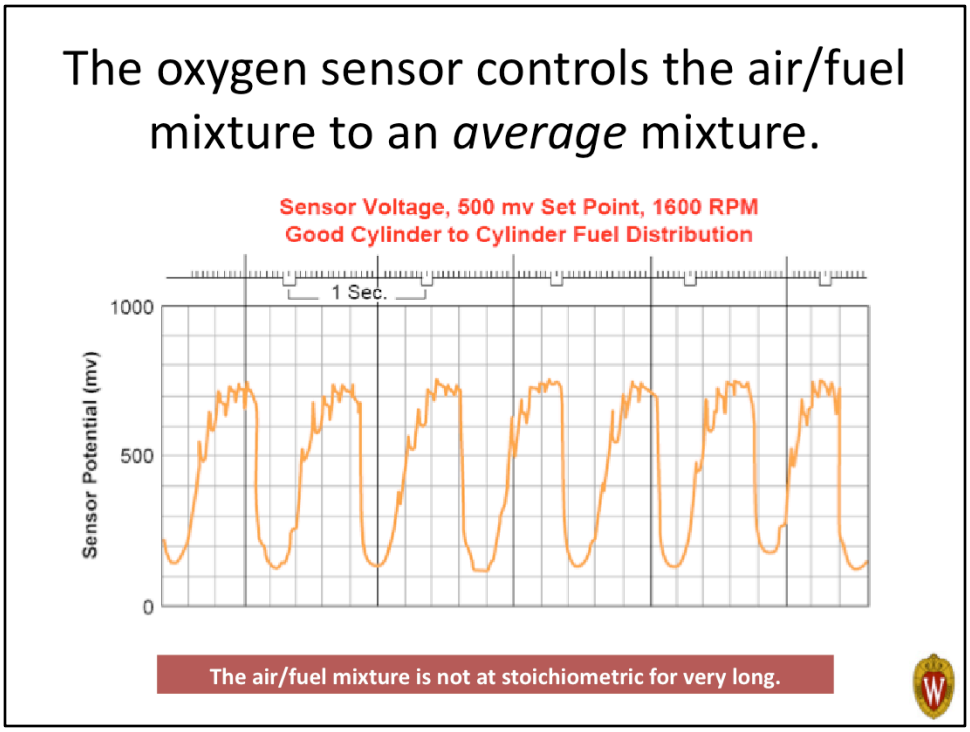
These practice is often called assertion/evidence method, as the header asserts and the visuals provide evidence.

Let's take a look at a few examples from both industry and EPD of sentence headers in action.




As this example demonstrates, sentence headers not only categorize what we are seeing as visual evidence, but qualify it and contextualize it as well. Therefore, instead of just understanding what we are seeing, we now know how to think about what we are seeing in a larger context. In this way, sentence headers tell us the FULL story of the work being presented instead of just random pieces.

Example Source:
Talk entitled “

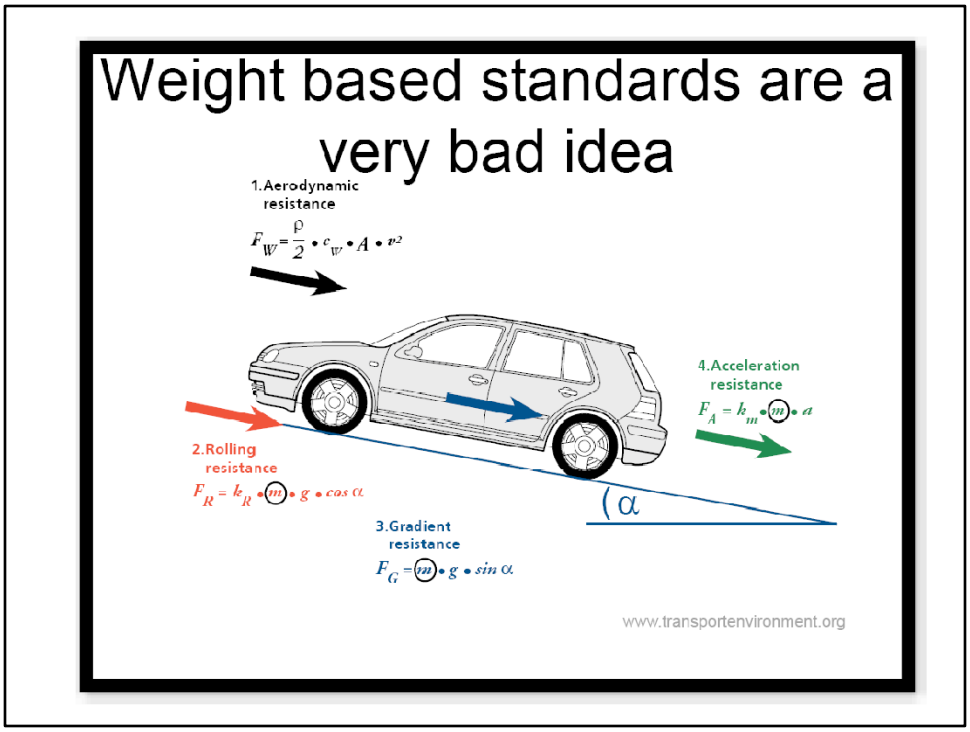



This slide shows a strong assertion header about an oxygen sensor.

The visual evidence is provided in the graphic.

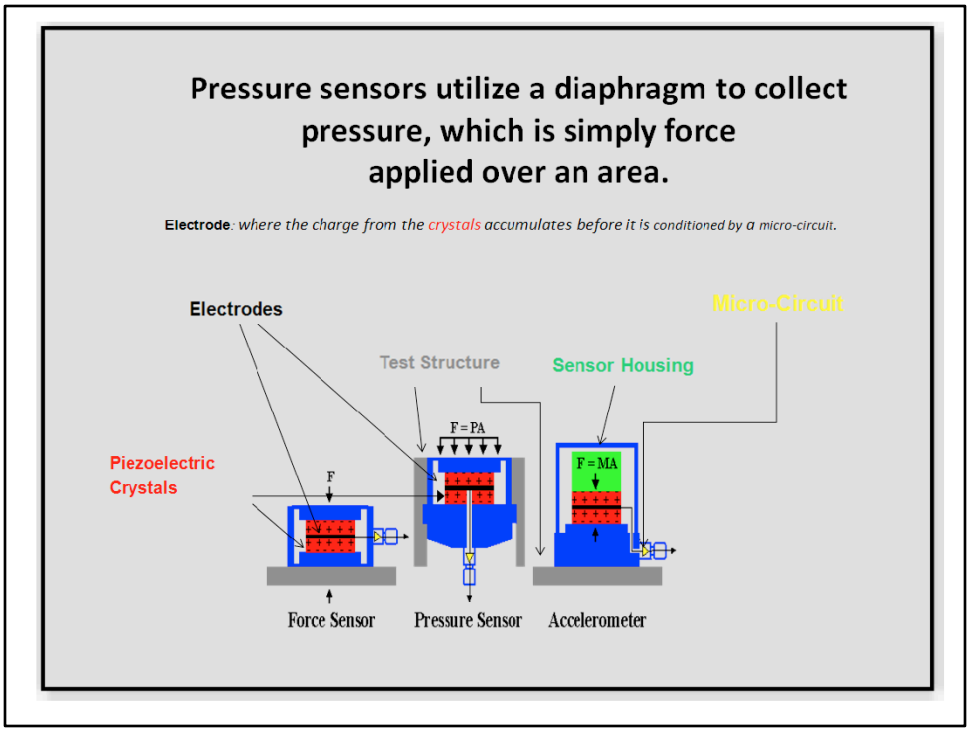
At the bottom is an interesting addition—an exit note that provide a review of what was learned.

Slide adapted from:
http://www.arb.ca.gov/research/seminars/mooney/mooney.pdf

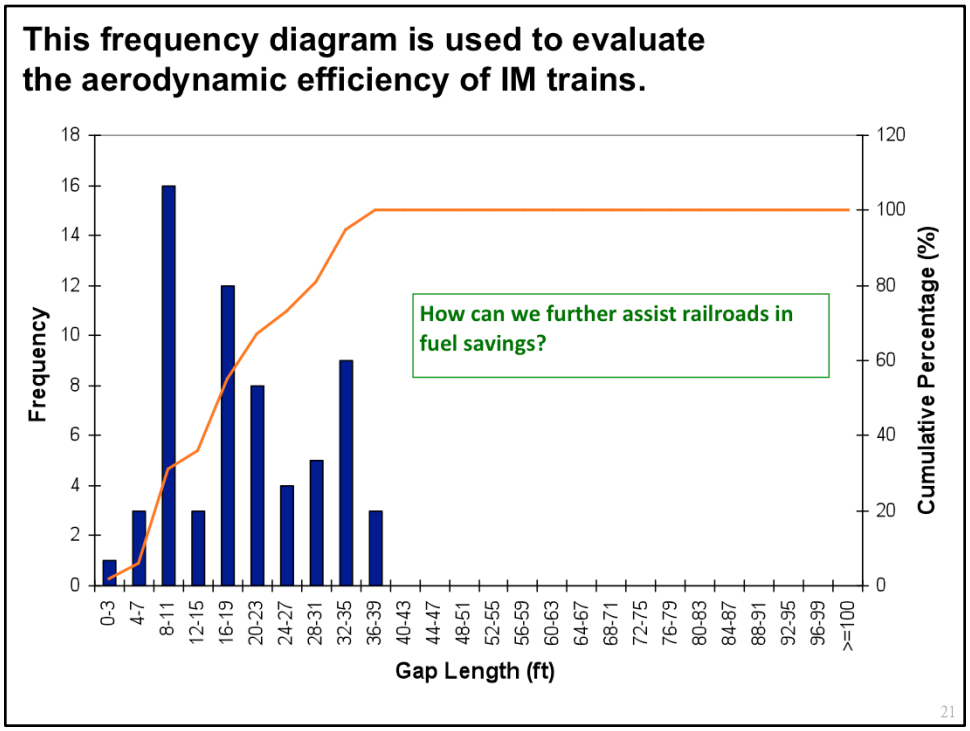



Here is another example where we see not just the evidence, but are given the entire argument through a careful layering of information into the visual. Other design elements such a color add another way for us to differentiate the points that the speaker is sharing with us. Because these items are brought in through a controlled release of information, we do not have to struggle to decide whether to listen or to read.

Slide source:
http://www.internationaltransportforum.org/Topics/Workshops/WS1DingsSlides.pdf




As this example illustrates, sentence headers can also act as a means of establishing terms and concepts used in the presentation. This example shows an embedded definition of the concept of pressure, which is useful to less experienced audience members who may be struggling to learn or comprehend the material otherwise. By embedding definitions into sentence headers, speakers can be sure to reach the broadest swath of audience members while not boring those more experienced listeners.

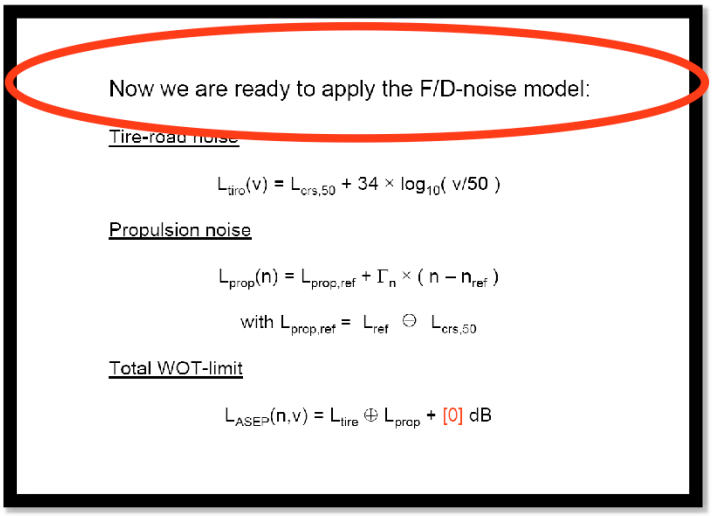



Here is another example of a sentence header that tells us toward what purpose we can use the visual data provided. In addition, the question provided through controlled release animation prompts us to think further about the data and brings us to the next point that the speaker intends to cover.

These pictures show the portable equipment setup.
(1)

Slide source:
http://ict.illinois.edu/railroad/CEE/.../IMOPT_Railroad%20Seminar_2.ppt

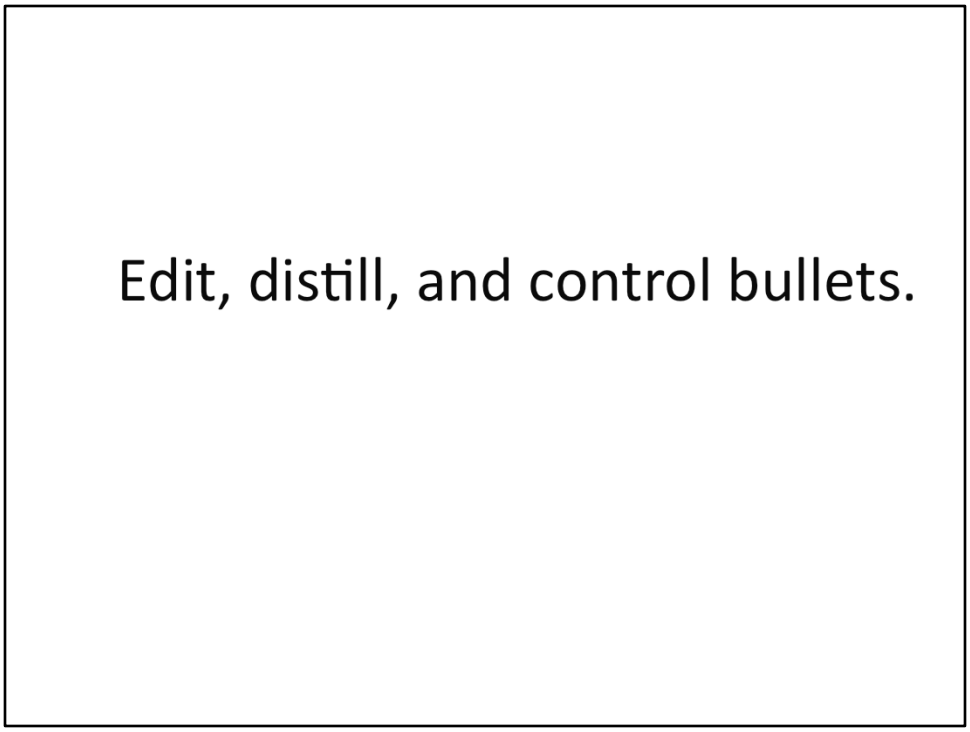
## Use sentence headers for transitions.




Sometimes, as this example demonstrates, the transitions to the next point can be integrated directly into the sentence header itself. In the original slide example, each of these formulas were layered in with controlled release animation, allowing the audience to focus on each piece distinctly.

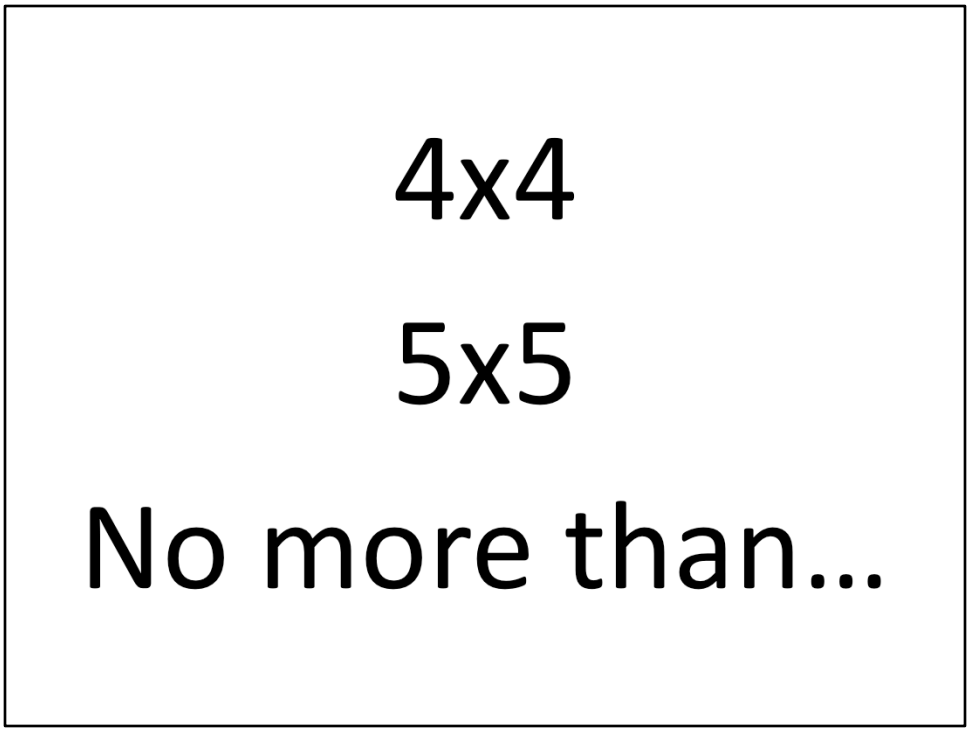
Source:

http://www.unece.org/trans/doc/2008/wp29grb/GRBIG-ASEP-09-005.pdf




Getting away from the use of too many bullets is perhaps the most difficult aspect of these techniques for presenters. But bullets are aptly named—they kill.

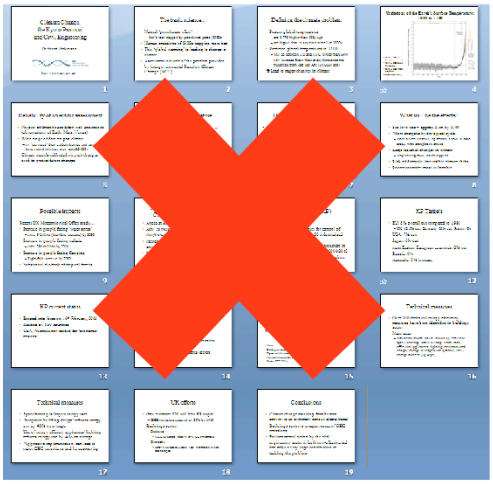
They create fragmented thoughts, they often don't flow logically from one to the next, and they are too text heavy for learners to process while the subject matter expert is talking. Bullets can actually prevent retention of information because they fight with what the speaker is saying or doing.




You may have heard various rules over the years about how much text to use, how many bullets are permissible, and so forth. There is NO basis for these rules in any research to date.

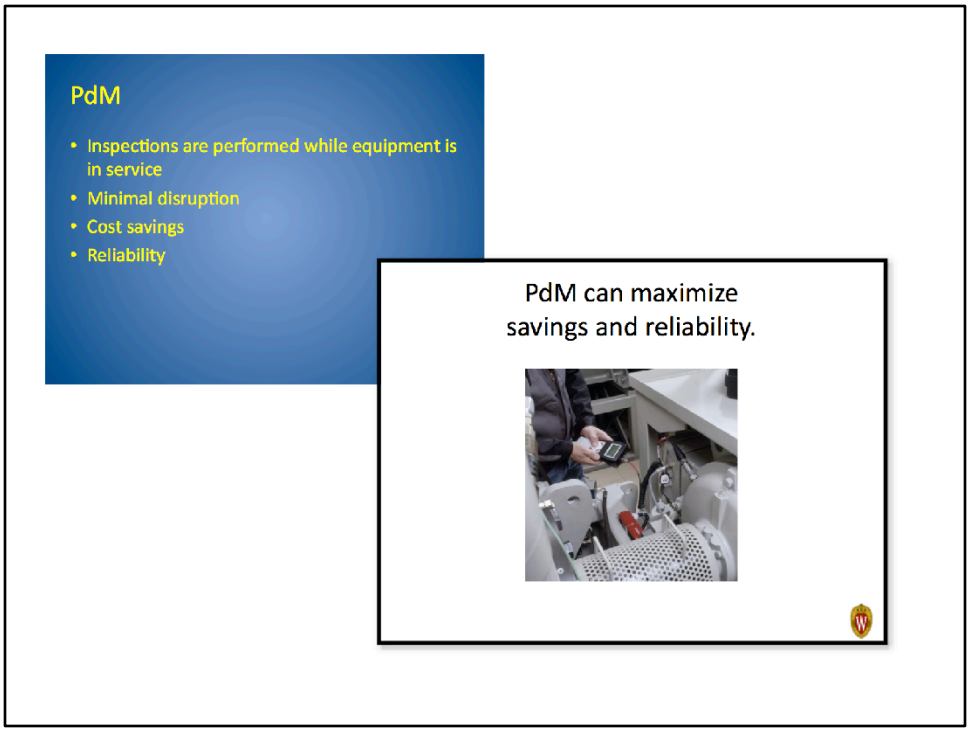
As we have discussed, there IS research about how much load the human mind can take at any given moment, and it's not a lot.

Visuals convey more than bullets.



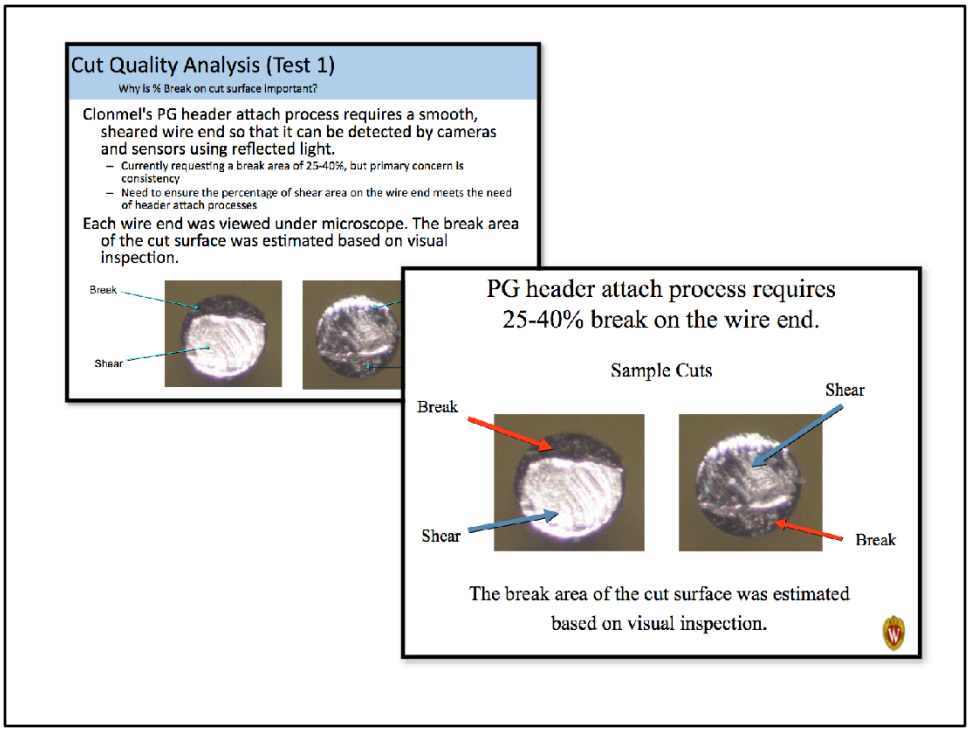
To maximize retention from our audiences, we need to go with a much higher visual strategy combined with severe restraint from bullets. And while bullets can, indeed, be useful – even needed – at times, they should not be the defining strategy for your information delivery.

Let's look at some general before-and-after examplesthat demonstrate how to move away from bullets and heavy text.



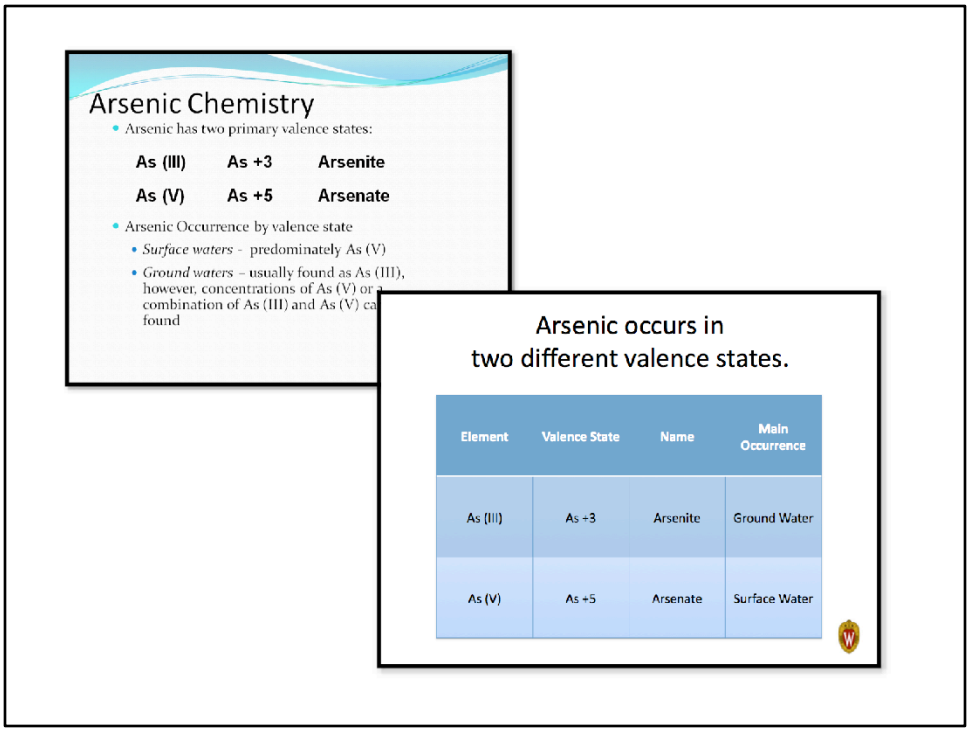

On the left, we can see a “traditional” approach that is a bulleted list. It is fragmented, hard to follow, and incomplete.

On the right, we see a revised version with an assetion header and a visual of the process.




On the left, again we see a “traditional” slide that is laden with bullets and too much information. The complex information is hard to distill and makes little sense, even as notes.

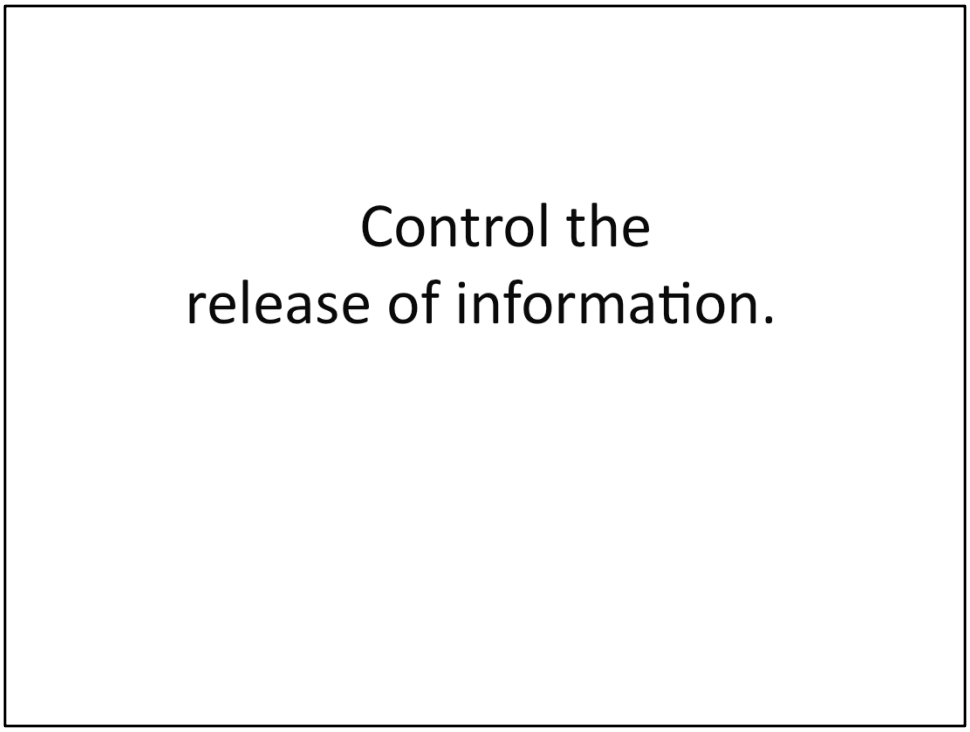
On the right is a cleaned-up version. The emphasis has been defined more closely (on the percentages), and the main points have been highlighted. There is little doubt that users will find the key information.



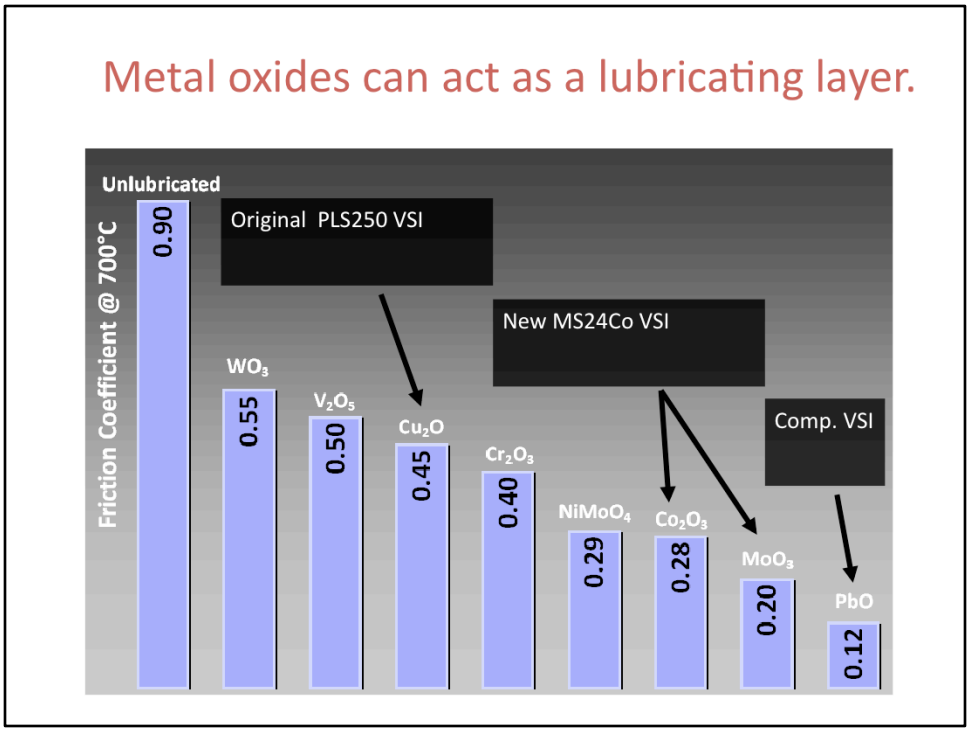

Another set of examples…

On the left, a traditional approach that used bullets to try to explain relationships of the valence states.

On the right, we can see that a table, used as our visual, does a much better job.




Contolling the release of information by bringing in elements one by one is an effective strategy. Let's look at some examples of how this works particularly well for technical arguments.




Here, we have the main assertion at the top so that we understand the context. However, as each of the black boxes are brought in, the speaker introduces us to the ways that these various oxides have been used in his organization over the years, and where they intend to head with their use of them in the future.

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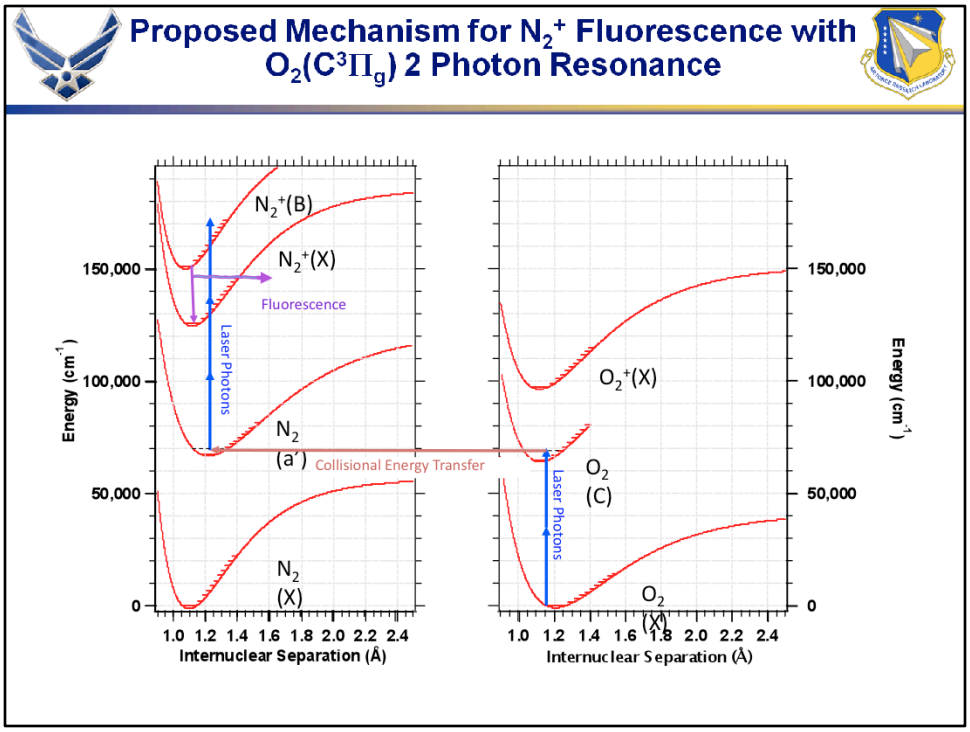
Content notes from original MEPP presenter:
The metal Dicopper oxide of  is 0.45

DiCobalt Trioxide is 0.28
Molybdenum trioxide is 0.20

Lead Oxide is 0.12

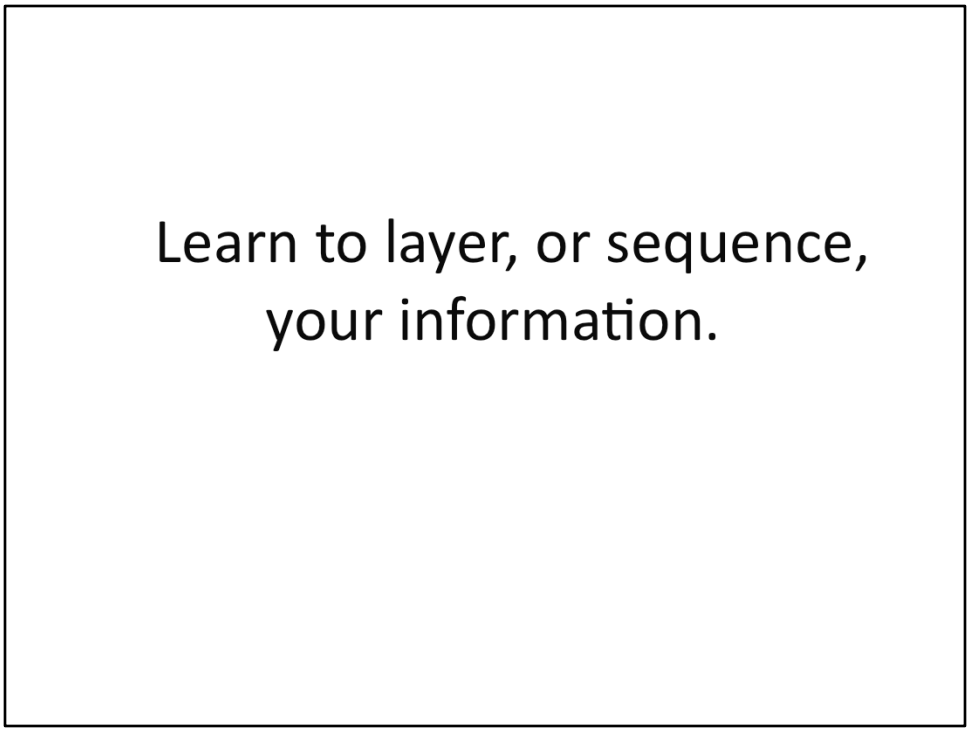
This is a simplified representation as the alloy of materials forms a alloy oxide.



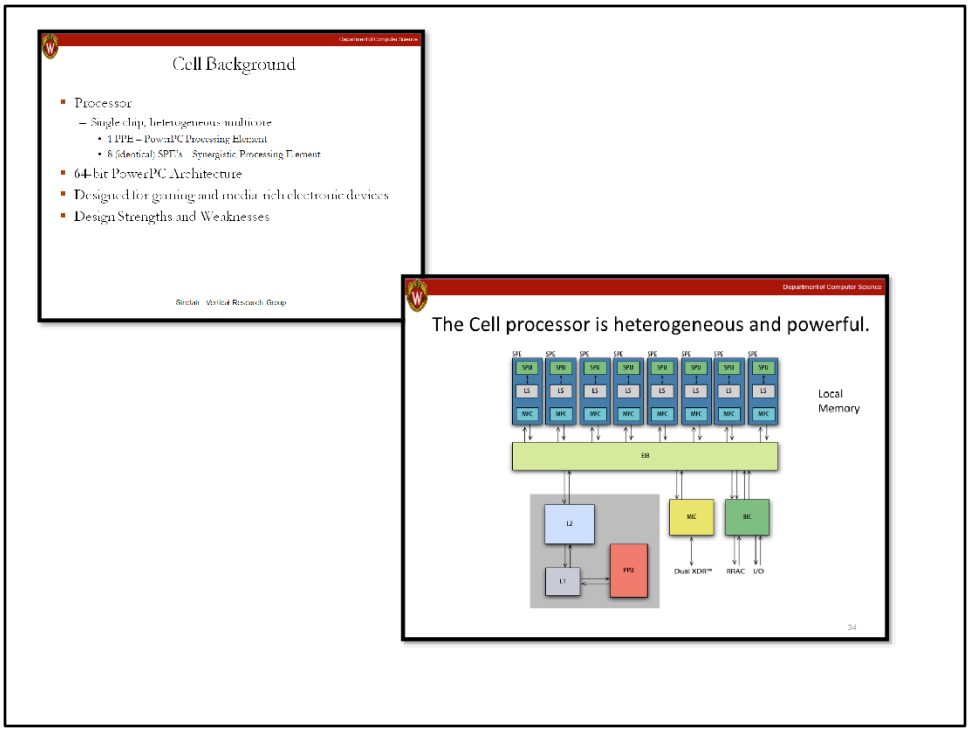

In this example, we see a great use of the animation features to bring in pieces of the technical information one by one. The speaker can then narrate the examples, as they happen, making the information much easier to parse by the audience.

Slide source:
INVESTIGATION OF $O_2(C^3\Pi, v=2)$ BY NOVEL LASER PHOTOIONIZATION TECHNIQUE IN AIR AT
ATMOSPHERIC PRESSURE

Jonathan D. Umbel,
Dr. Steven F. Adams,
Dr. Charles A. DeJoseph, Jr.
Air Force Research Laboratory
Wright Patterson AFB, OH

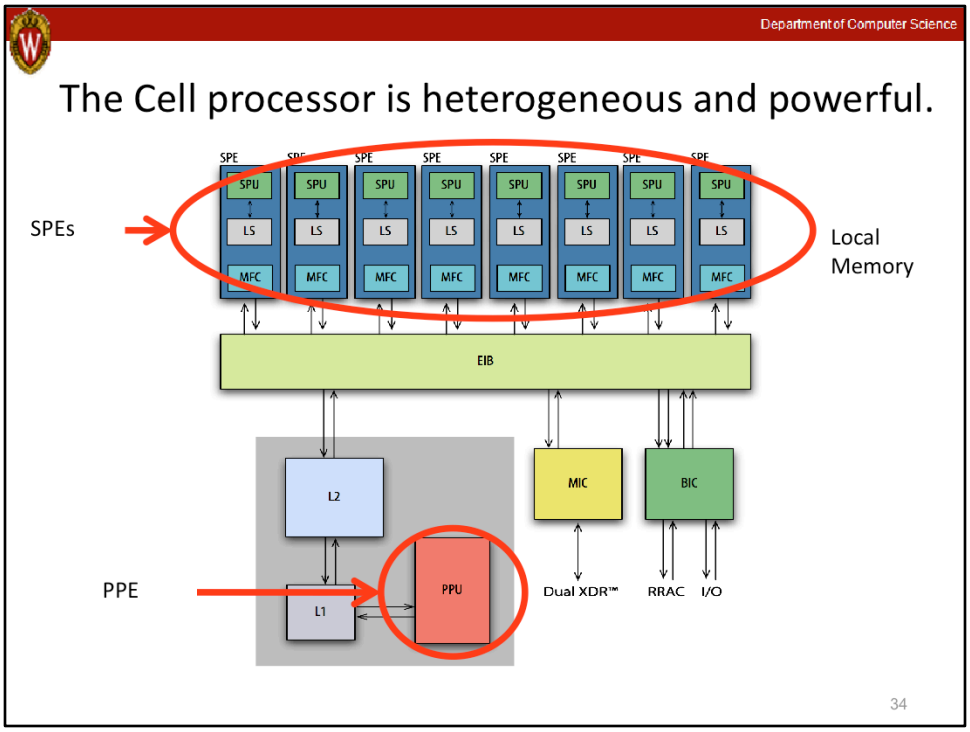



Because in the technical realm, we often work with and aim to improve processes, using our visuals to help show process is a great way to help audiences understand them.




On the left is a traditional BEFORE slide. On the right is the engineer's revised slide that uses relevant visuals that highlight the architecture he was trying to describe by bullets.

Source:
Matt Sinclair, EPD 397, Fall 2009. He is part of the Vertical Research Group for his graduate work.




After revising the previous text-heavy slide, and switching to a more visual approach, the speaker was able to walk the audience through the process by which information was saved in the cell processor, bringing them to more deeply understand the underpinnings of his work.

This is the AFTER slide from Sinclair.

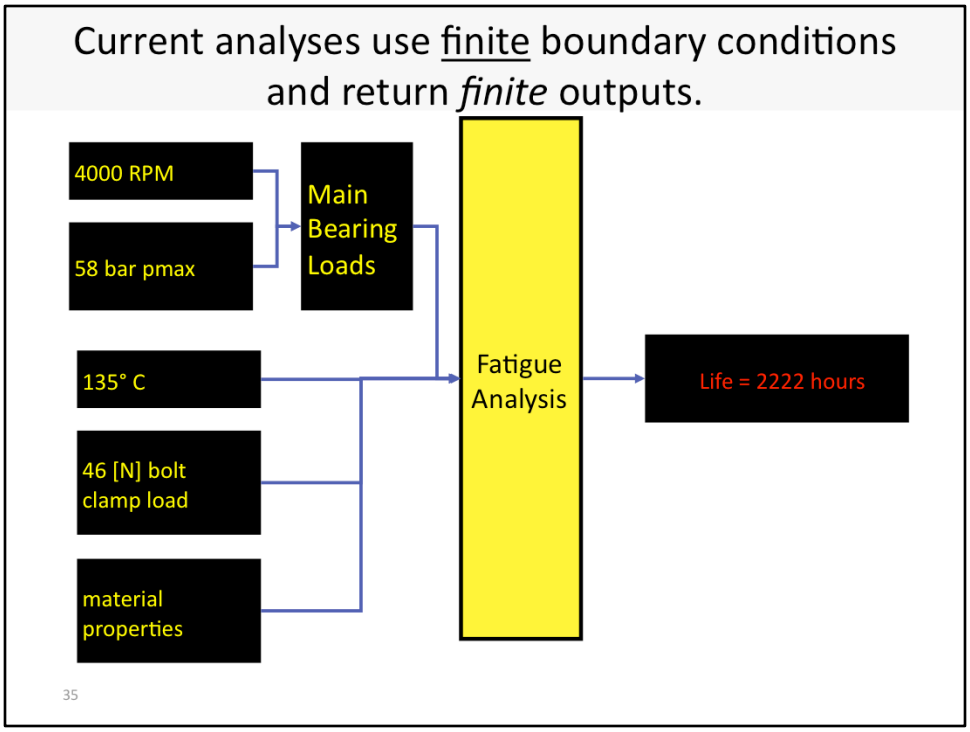
He writes this:

Picture from:
J. Kurzak, A. Buttari, P. Luszczek and J. Dongarra, "The Playstation 3 for high-performance scientific computing," Computing in Science and Engineering, vol. 10, pp. 84, 2008.

As you can see from this picture, the Cell processor has many different units packed onto its chip. Today I will be covering the main parts of the processor. The Cell processor is a single chip, heterogeneous multicore, 64-bit architecture. It contains 1 PPE (also known as PPU) – the PowerPC Processing Element. This core is the master of the Cell processor. All work that is sent into the Cell processor is initially sent to the PPE. The PPE is then responsible for dispersing the work to the 8 (identical) SPE's – Synergistic Processing Elements.

The SPEs act as the slaves in the Cell processor – they perform whatever task the PPE tells them to do. This design is not typical of modern computer architectures, but it lends itself to certain types of applications. Part of using the SPEs is the unique memory system of the Cell processor, which requires the user to perform their own memory operations. Additionally, the memory uses a non-standard, DMA-centric approach. Each SPE has a Local Store (LS), which uses the MFC (memory controller) to take in and move out data from the global memory and place it into the local LS memory. These transfers take place via the EIB bus.

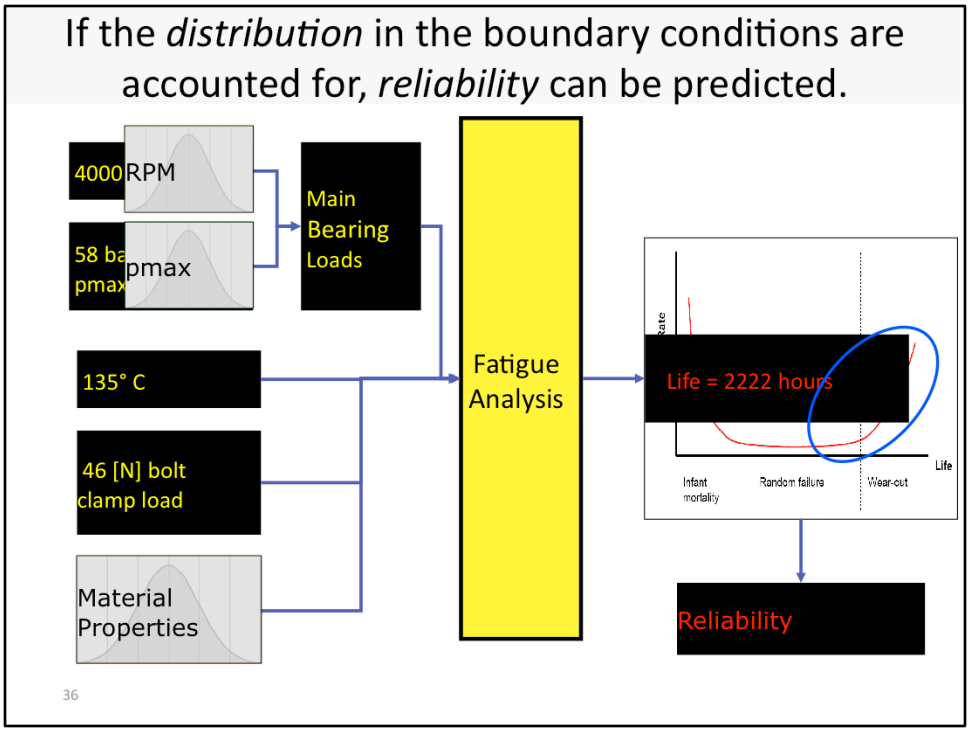
There are several other components pictured here that, while important, I am not going to discuss.




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.

**Content Notes from original UW MEPP/MEES 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.

**CONTENT Notes for DTL audience:**
SIMPLIFY TRANSITIONS

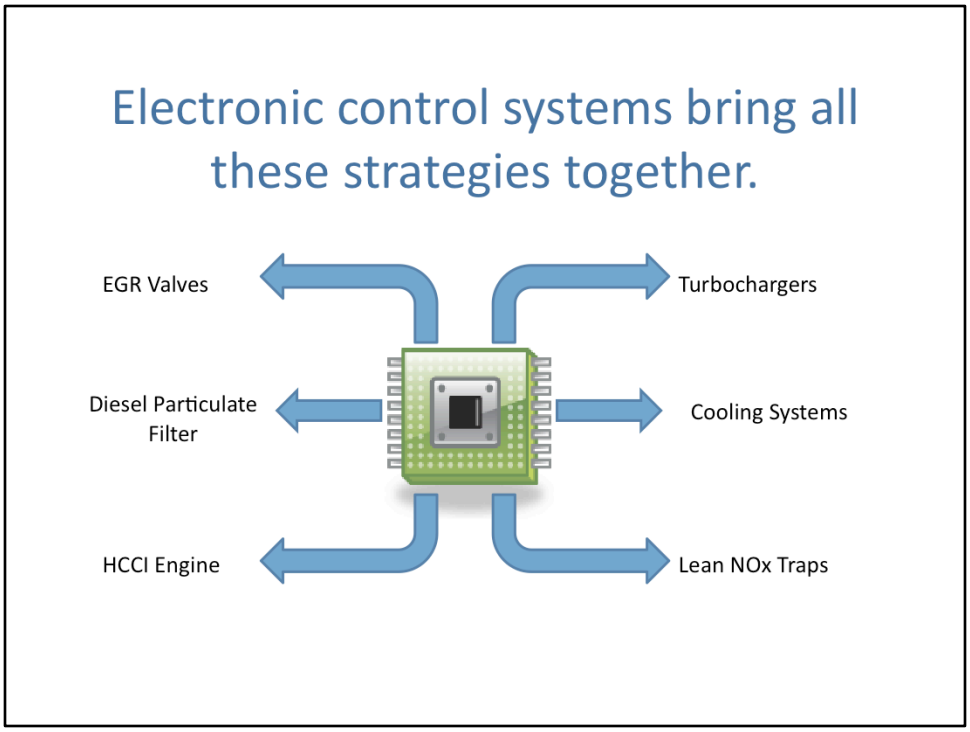



Because of the way he has used animations and visual objects to tell the story of his argument, we get a much more clear, complex, and contextualized view of what he is arguing for here.

**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.

**Content notes for this talk:** SIMPLIFY TRANSITIONS

One last point that we'd like to make in this module is that not all visuals are created equal. Learning to think visually about your topic means carefully considering your audience first and recognizing that tangentially related clip-art images are usually not the best way to tell the story of your work. Whether is means creating your own image using standard shapes, or using an image from another source and citing that work, you will need to think critically about how to show what you are telling the audience about.




Sometimes, as this slide demonstrates, even using a central visual to anchor what would otherwise be bland textual bullets can work well as a memorable technique to summarize material for an audience. This speaker used basic shapes and a simple clip art image to show the various components of a system that he was discussing in his work.

This is an example from Sam Graner, Fall 2009 EPD 397. His target audience were people in the engine systems profession, with a talk entitled "Measures to Reduce the Emissions of Light Duty Diesel Engines."

He writes in his notes (berlow), to use as his talking points and for archival purposes.
---

EGR Valves (With VVT):
- Sensors that tell system when to open and close valves

DPF:
- Temperature sensors that tell when to begin cooling process

HCCI Engine:
- Required for operation of engine

Turbochargers:
- Can precisely measure pressure and adjust fuel released in real time.

Cooling systems:
- Allows engine to run optimally

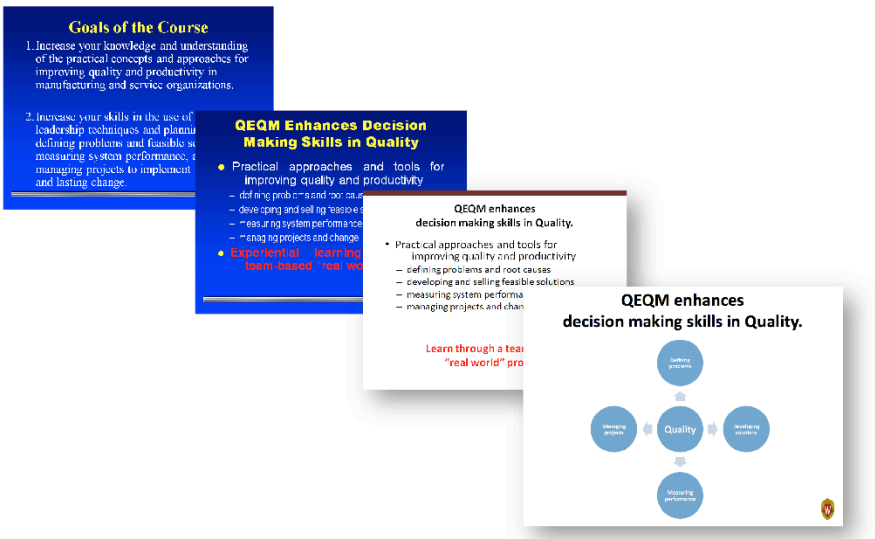
LNT:
- Adjust flow of reductant for optimal running

Graphic:
Microsoft office clip art

Information:
Knecht, 2006

Dohle, W., Eimers-Klose, D. (2006, October 16). Clean diesels – Future development trends for fuel injection and exhaust gas treatment systems. Report No. 2006-21-0025. SAE Digital Library.

# Let's look at the transformation.




In the next few frames, we will observe the transformation of a slide done in the traditional manner to one that reflects more the principles we have been discussing here.

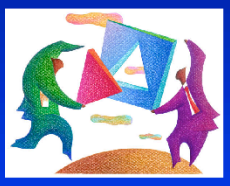
Here we see too much text—the slide should not compete with the speaker.

SLIDES ARE NOT notes or scripts.

Let's look at the next version of the slide…

## QEQM Enhances Decision Making Skills in Quality

- Practical approaches and tools for improving quality and productivity
  - defining problems and root causes
  - developing and selling feasible solutions
  - measuring system performance
  - managing projects and change

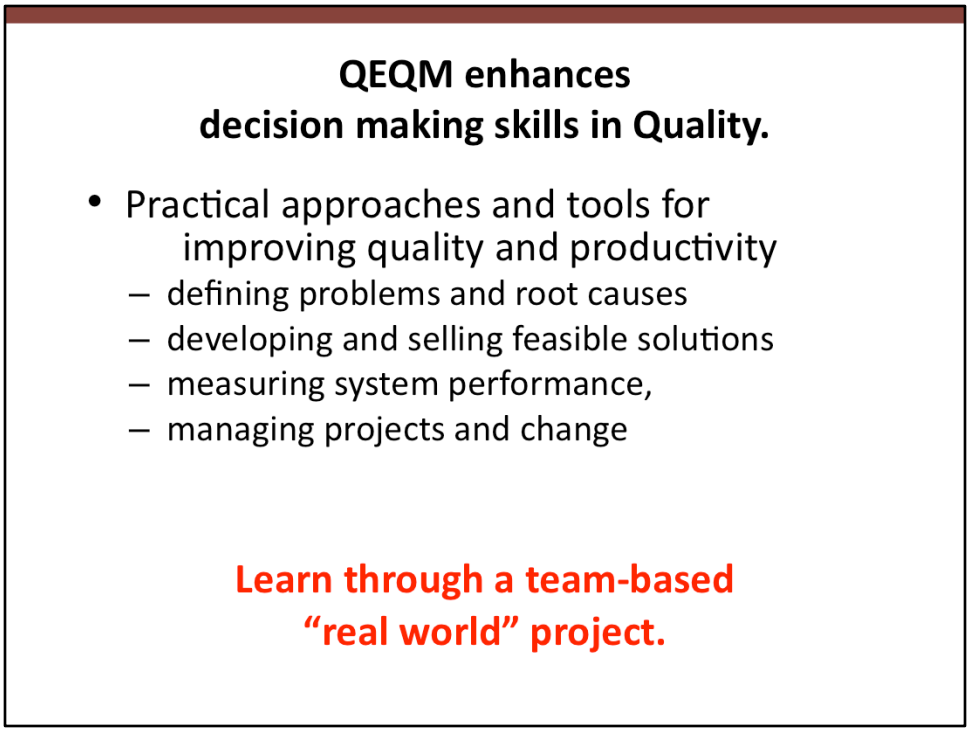


There is some improvement here.

We see  a sentence assertion header and a picture has been added.

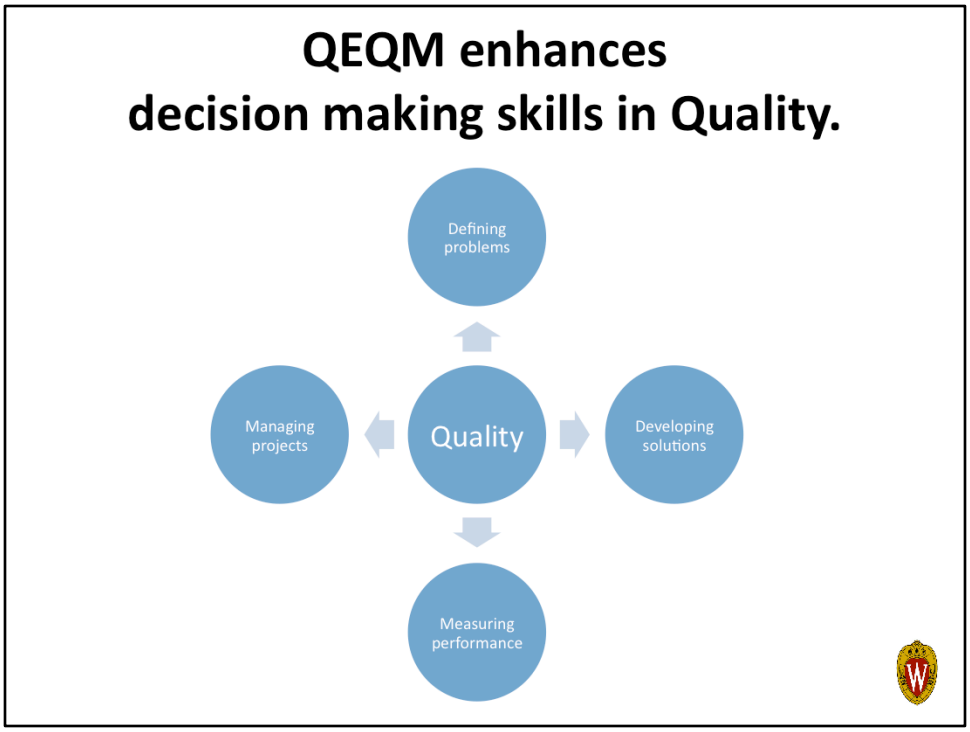
However, there are quite a few words, there are still layers of bullets, and the grapic that doesn't necessarily speak to the topic.

In the next version, we will start to apply some EPD methods…




In the "live" version of the slide deck, these bullets come in one by one, as you click them. Such a method reflects that idea of the "controlled release of information." As well, it keeps folks from reading ahead; they stay more "in the moment" if all of the text doesn't appear at once.

Notice the parallel structure of the bullets, all using "ING" verbs



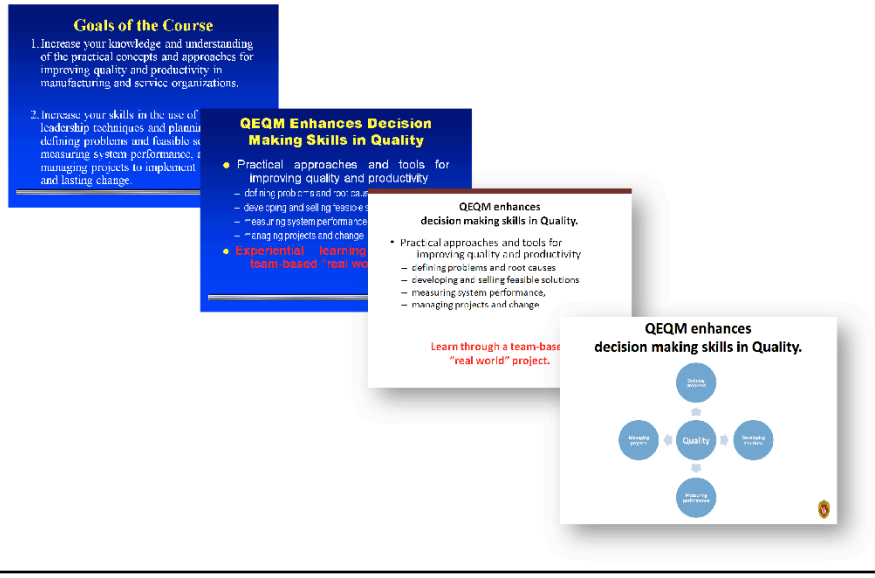

Here is a possible final version of the slide.

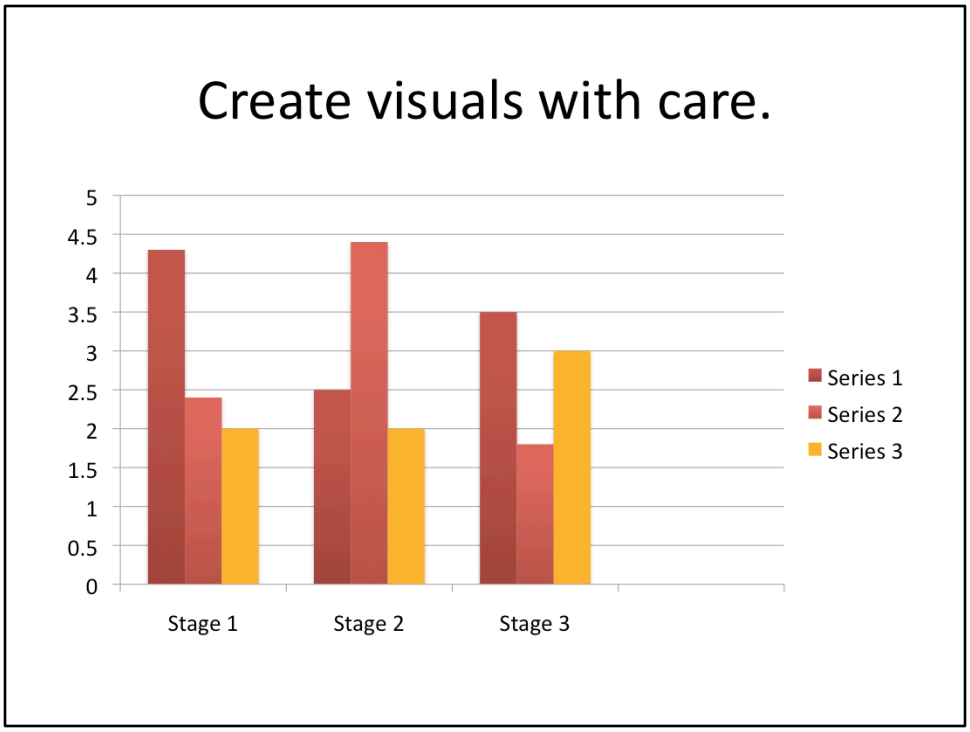
The assertion header is in place and makes the main point.

The visual speaks to the topic and enhances the breakdown of the topic.

The EPD template has been added in.

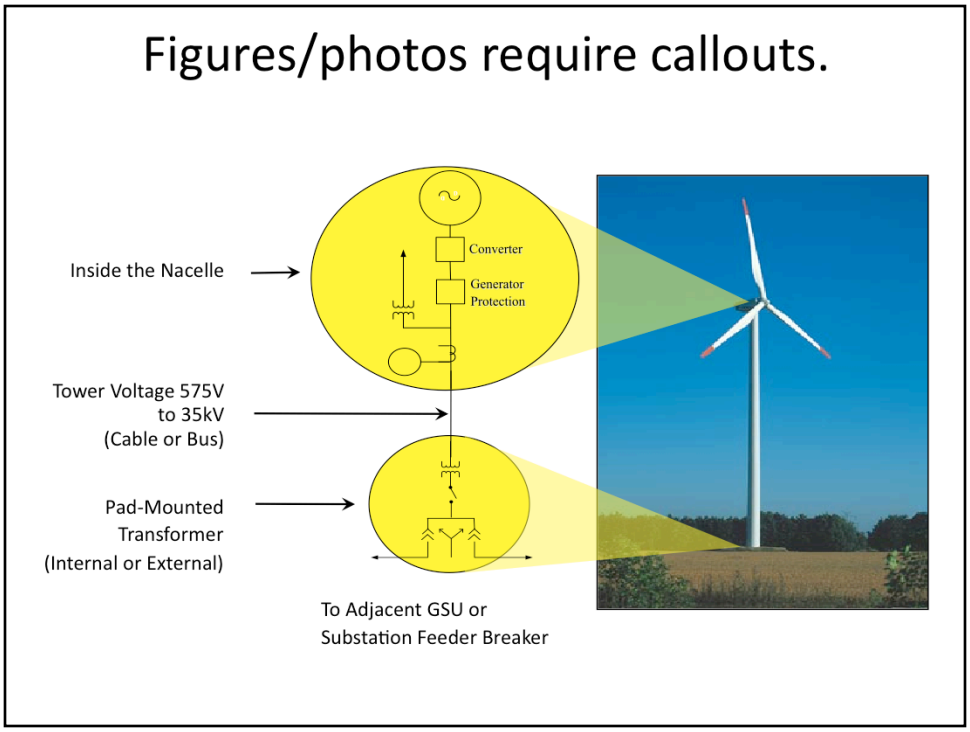
# The transformation is powerful!





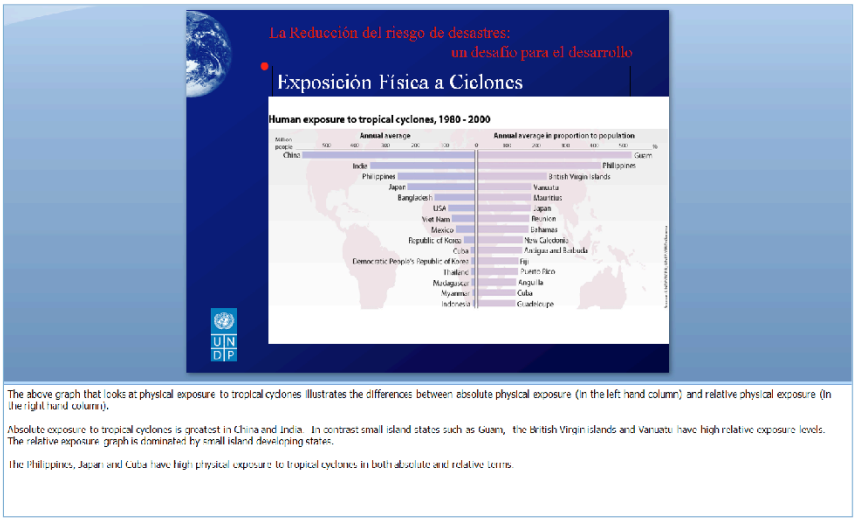

Charts should be flat because other formats visually distort our numbers.

Label all parts.




Use callouts, targeted visuals, or other detailed approaches to technical information. Otherwise, figures have no context later when class participant refers to notes.

# Use the Notes field for storing extra content.



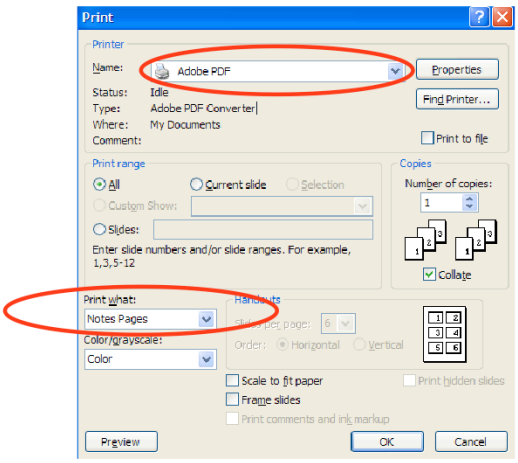

The above graph that looks at physical exposure to tropical cyclones illustrates the differences between absolute physical exposure (in the left hand column) and relative physical exposure (in the right hand column).

Absolute exposure to tropical cyclones is greatest in China and India. In contrast small island states such as Guam, the British Virgin Islands and Vanuatu have high relative exposure levels. The relative exposure graph is dominated by small island developing states.

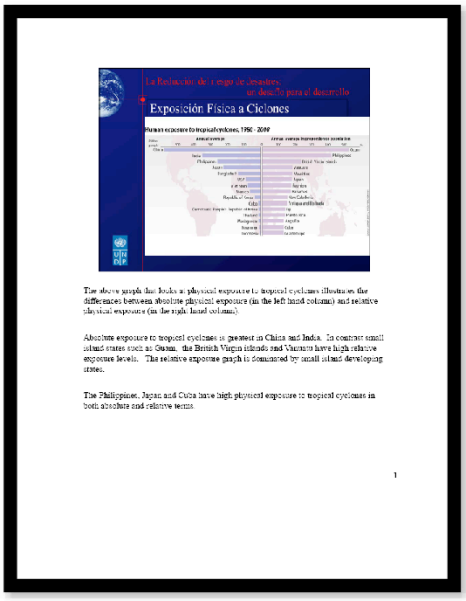
The Philippines, Japan and Cuba have high physical exposure to tropical cyclones in both absolute and relative terms.

NOTES can hold talking points, fine details, meeting notes, references, and more. More can be storied in Notes than can ever be put on slides!

Here’s how to print to PDF with notes in order to archive.



Your PDF page will then look like this to anyone who accesses it.



La Reducción del riesgo de desastres, un desafío para el desarrollo

## Exposición Física a Ciclones

Human exposure to tropical cyclones, 1950 - 2010

The above graph that looks at physical exposure to tropical cyclones illustrates the differences between absolute physical exposure (in the left hand column) and relative physical exposure (in the right hand column).

Absolute exposure to tropical cyclones is greatest in China and India. In contrast small island states such as Guam, the British Virgin islands and Vanuatu have high relative exposure levels. The relative exposure graph is dominated by small island developing states.

The Philippines, Japan and Cuba have high physical exposure to tropical cyclones in both absolute and relative terms.

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# Questions?

Send questions about these methods or the template to either of these Course Development and Delivery Team email addresses:

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ddtechsupport@epd.engr.wisc.edu

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