Presenting with Power: Effectively and Dynamically Communicating Your Design Project

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80% of Your Presentation Will Be Forgotten

- People tend to remember
  - Tone
  - Pace
  - Nonverbal expressions
The purpose of a PDR is to communicate the technical details of the design.

• **WHAT** you have been working on
• **WHY** it is important (the need?)
• **WHO** is the customer
• **HOW** much does it cost
Customize Content for the Audience

• Who will be in the audience?

• What are their expectations?

• Are you presenting new material or building upon prior knowledge?

• How many attendees?

• Will the talk be interactive?

• How much time is allotted for the talk?
Content Guidelines for a Preliminary Design Review

• Title slide (highly descriptive title)
• Project overview: what, why, who, how much
• Design objectives
• Explanation and illustration of design
• Review of design approach
• Explanation of acceptance testing
• Problems/issues with design
• Project schedule and future work
• Current status of project
PowerPoint Do’s

• Include a **descriptive** title/heading line on every slide.

• Keep slides simple and uncluttered by using short phrases, not long sentences.

• Use consistent capitalization and punctuation on all slides.

• Use consistent construction on all bullet items.
Choosing a Font

**Easy**
- san serif
- block
- bold

**Difficult**
- serif
- italics
- plain

**Examples:**
- Helvetica
- Arial
- Sit

**Examples:**
- Times
- New York
- Sit
Effective Font Size

This is Helvetica 12 point (normal text)

Too small!

This is Helvetica 18 point

This is Helvetica 24 point

This is Helvetica 36 point

This is Helvetica 48 point
To Upper Case or to Lower Case, That is the Question

A mixture of upper and lower case letters is easier to read quickly and accurately, and takes up less space on the slide.
Choosing the Right Contrast and Colors

• White background with dark text is the norm at professional conferences.

• Dark backgrounds with light text project well.

• Red, orange, or blue lettering become unreadable when projected on dark background.

• Avoid “busy” slide designs, those with distracting borders or graphics; keep it simple and “clean.”
When to Show & When to Tell

• Make use of visuals wherever you can!
• Show what you’re doing:
  – Diagrams
  – Photos
  – Flow charts
  – Tables
• Use text when you present concepts that you can’t show or when words help to describe the visual.
Let’s look at some examples of effective use of graphics
Three Versions of the Same Info

**Average monthly high and low temperatures in four U.S. cities**

<table>
<thead>
<tr>
<th></th>
<th>Seattle</th>
<th>Atlanta</th>
<th>Kansas City</th>
<th>Honolulu</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>46/37</td>
<td>54/36</td>
<td>39/22</td>
<td>82/73</td>
</tr>
<tr>
<td>February</td>
<td>49/38</td>
<td>57/37</td>
<td>44/26</td>
<td>82/73</td>
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<tr>
<td>March</td>
<td>53/40</td>
<td>63/41</td>
<td>53/33</td>
<td>82/73</td>
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<tr>
<td>April</td>
<td>59/44</td>
<td>72/50</td>
<td>66/45</td>
<td>82/73</td>
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<tr>
<td>May</td>
<td>66/49</td>
<td>81/59</td>
<td>75/55</td>
<td>82/73</td>
</tr>
<tr>
<td>June</td>
<td>70/53</td>
<td>87/66</td>
<td>85/66</td>
<td>82/73</td>
</tr>
<tr>
<td>July</td>
<td>75/56</td>
<td>88/69</td>
<td>91/71</td>
<td>82/73</td>
</tr>
<tr>
<td>August</td>
<td>74/56</td>
<td>88/68</td>
<td>89/69</td>
<td>82/73</td>
</tr>
<tr>
<td>September</td>
<td>69/53</td>
<td>83/63</td>
<td>82/60</td>
<td>82/73</td>
</tr>
<tr>
<td>October</td>
<td>60/48</td>
<td>74/52</td>
<td>71/49</td>
<td>82/73</td>
</tr>
<tr>
<td>November</td>
<td>52/42</td>
<td>62/40</td>
<td>54/35</td>
<td>82/73</td>
</tr>
<tr>
<td>December</td>
<td>48/39</td>
<td>53/35</td>
<td>43/27</td>
<td>82/73</td>
</tr>
</tbody>
</table>

**Average high temperatures for winter months in four U.S. cities**

<table>
<thead>
<tr>
<th></th>
<th>Seattle</th>
<th>Atlanta</th>
<th>Kansas City</th>
<th>Honolulu</th>
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</thead>
<tbody>
<tr>
<td>November</td>
<td>48</td>
<td>62</td>
<td>54</td>
<td>82</td>
</tr>
<tr>
<td>December</td>
<td>52</td>
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<tr>
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<tr>
<td>February</td>
<td>49</td>
<td>57</td>
<td>44</td>
<td>82</td>
</tr>
</tbody>
</table>
**Specimen #1**
6.35mm/0.25” long edge notch introduced in 10 length increments (notch width of 0.025mm/0.01”)

**Specimen #2**
6.35mm/0.25” diameter hole drilled in 11 increments

*Aluminum*
50.8mm x 152.4mm x 4.76mm
(2” x 6” x 3/16”)

2.25 MHz, 12.7mm diameter piezoelectric discs bonded to top surface
"High Level" Flow Chart

Start

Define channel sequence and parameters

Ready to acquire?

No

Acquire/store single measurement from all channels

Done?

No

Yes

Stop

Parameters for each channel are transmitter, receiver, P/R setup file, and TDS5034 setup file

Initiated either by keystroke or timed
Ultrasonic Signals from Nominally Identical Samples

Undamaged Specimen #1 at Room Temperature

Undamaged Specimen #2 at Room Temperature
And here’s what doesn’t work
Ineffective!

Medtronic Delta Valve

Codman Hakim Programmable Valve

Medtronic Strata Valve
## Schedule of Due Dates

<table>
<thead>
<tr>
<th>Recommended Presentation Content</th>
<th>Proposal Report</th>
<th>Design Review Presentation</th>
<th>Final Presentations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Qualitative Project Goals (brief)</td>
<td>September 15</td>
<td>By 24 October</td>
<td>Dead Week</td>
</tr>
<tr>
<td>2. Quantitative Project Specifications</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. Background Research: State of the Art</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4. Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Schedule (GANTT or similar chart)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Budget</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7. Results</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Highlights:</strong></td>
<td><strong>Contrast candidate paths and commit</strong></td>
<td><strong>Audience relevant</strong></td>
<td><strong>Results with contrast to proposal</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td></td>
<td><strong>&lt;10 minutes</strong></td>
<td><strong>&lt; 15 minutes</strong></td>
</tr>
</tbody>
</table>
Now let’s look at some

Before and After

examples
System Description

• PC-Based Oscilloscope (TDS5034)
  – Controls multiplexer via USB interface
  – Controls pulser-receiver via GPIB interface
  – Runs LabView

• Pulser Receiver
  – Signal output goes to scope input and is digitized
  – Transmit and Receiver are connected to the Mux

• Eight Channel Multiplexer
  – Supports up to 8 transducers
  – Routes Transmit and Receive to/from transducers
  – USB interface with scope PC
System Block Diagram

- TDS5034 (LabView)
- 5800PR Pulser/Receiver
- USB Converter (inside Mux)
- Multiplexer

- GPIB (Control)
- Signal Out (analog - coax)
- Transmit (analog - coax)
- Receive (analog - coax)
- Digital Control (Ribbon Cable)
- To/From Transducers

- Much clearer
- More information
Ultrasonic Structural Health Monitoring System

- **Sensor Cluster**
  - Multiple ultrasonic sensors (up to 16 per cluster)
  - Each sensor can operate as a transmitter or a receiver
  - Synchronization between all sensors in a cluster
  - Processing capabilities for local data analysis

- **Structure with Multiple Sensor Clusters**
  - Local sensors for monitoring small areas
  - Global sensors for monitoring large areas

- **Wireless Link**
  - Sends raw waveforms or processed data to base station
  - COTS USB link (2.4 GHz)

- **Base Station**
  - Further processing of data
  - Can link/combine data from multiple sensor clusters
Ultrasonic Structural Health Monitoring System

Local Sensor Cluster #1

Local Sensor Cluster #2

Central Processing Station

Wireless USB Link

Waveform and/or Feature Data

Local Processing

Local

Global

Structural Component
Remember These?

• Title slide (highly descriptive title)
• Project overview: what, why, who, how much
• Design objectives
• Explanation and illustration of design
• Review of design approach
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• Problems/issues with design
• Project schedule and future work
• Current status of project
Let’s look at a few more examples of what works and what doesn’t
Methods for Quantifying Changes in Diffuse Ultrasonic Signals with Applications to Structural Health Monitoring

Jennifer E. Michaels, Yinghui Lu, and Thomas E. Michaels

Georgia Institute of Technology
School of Electrical and Computer Engineering

10th SPIE International Symposium
Nondestructive Evaluation for Health Monitoring and Diagnostics

March 6-10, 2005
Project Overview

• Monitor continuously integrity of critical structures, using permanently attached ultrasonic sensors.

• Apply technology for monitoring commercial airliners, bridges, and buildings. Primary client is Air Force.

• Estimate development costs at $3 million; initial cost of a deployed system, including instrumentation and wiring, should be less than $150,000.
Design Objectives: Weak

- Monitor structures
- Have attached ultrasonic sensors
- Read sensors
- Record waveforms
- Determine condition of structure
Design Objectives: Better

- Monitor continuously health of critical structures (airplanes, buildings) in real-time
- Attach permanent ultrasonic sensors near, on, or in structure
- Interrogate sensors, record waveforms
- Analyze waveforms to determine if structure has developed internal flaws or pre-flaw conditions
Technical Approach: Weak

- Pulse with transducer
- Flood with energy and look for diffuse waves
- Introduce temp. changes and defects
- Goal is to detect minimum flaw in the presence of temp. changes.
Technical Approach: Better

- Pulse with one transducer and receive with other
- Flood structure with energy, record response until energy has substantially died out (diffuse waves)
- Introduce temperature changes and artificial defects (separately and simultaneously)
- Goal is to discriminate between temperature changes and defects and to quantify minimum detectable flaw size in the presence of temperature changes
Measured Ultrasonic Signals

Undamaged Specimen at Room Temperature

Undamaged Specimen at 10°C (50°F)

Specimen With 6.35 mm (0.25”) Hole

Time (microseconds)
Short-Time Fourier Transform

- Undamaged Specimen At Room Temperature
- Undamaged Specimen At 10°C (50°F)
- Specimen With 6.35mm (0.25”) Hole
Data: Weak

• Waveforms were recorded at various temperatures.
• Waveforms were recorded at various temperatures as notch was enlarged.
Experimental Data: Better

- **Specimen #1**
  - 65 waveforms recorded from undamaged specimen at various temperatures
  - 397 waveforms were recorded from damaged specimen at various temperatures as notch was enlarged from 0.025” to 0.25” in length

- **Specimen #2**
  - 98 waveforms recorded from undamaged specimen at various temperatures
  - 64 waveforms recorded from damaged specimen at various temperatures as t hole was enlarged from 5/64” to 0.25” in diameter

- Goal: detect damage while minimizing false alarms
Future Work

- Implement data fusion at feature level to improve detection performance
- Develop, implement methods for estimating flaw sizes
- Investigate effect of flaw type and location on detection sensitivity
- Consider more complicated specimens with real defects
Project Summary

• Four candidate methods for comparing diffuse ultrasonic signal to baseline have been identified and evaluated for detecting damage in presence of temperature changes

• All four methods perform reasonably well if large number of baseline waveforms span expected temperature range
Presenting With Style: Look as Good as Your Slides

• Press shirts and slacks/skirt.
• Wear an undershirt.
• Select same color for shoes and belt.
• Shine your shoes.
• Minimize accessories.
• Wear no logos.
• Think conservative.
Giving Your Talk

• 10 minutes is a short, formal talk.
  • Edit your comments.
  • Plan your comments for each slide.
  • Stick to your slides—don’t digress.

• Use slides as prompt. Do not read.
• Project your voice.
• Maintain eye contact.
• “Make friends” with brief silences.
• Be prepared to answer questions.
Performance Techniques: Bring Your “A” Game

• Take a deep breath.

• Stand up straight, but relaxed.

• Maintain eye contact with your audience.

• Project your voice.

• Pace the rate of your speech at natural and moderate.

• Monitor gestures and avoid habitual behaviors.
Presentation Never’s

- **Never** run over your time limit. Ever!

- **Never** apologize for any aspect of your presentation. If you have to apologize, you aren’t prepared.

- **Never** respond aggressively to a question or comment. Even if you are right, the whole audience will resent you for picking on that poor questioner.
Top 5 Secrets of the Pros

5. Tour the space you’ll be presenting in prior to your talk.

4. Make sure the room’s technology is compatible with yours.

3. Stand to one side of the projection screen instead of behind the podium.

2. Use the “meteorologist chop” instead of a laser pointer or a cursor.
And the #1 Secret…

Practice!
A lot!