Compliance Through the Business' Lens: The Presentation and Communication of Quantitative Data

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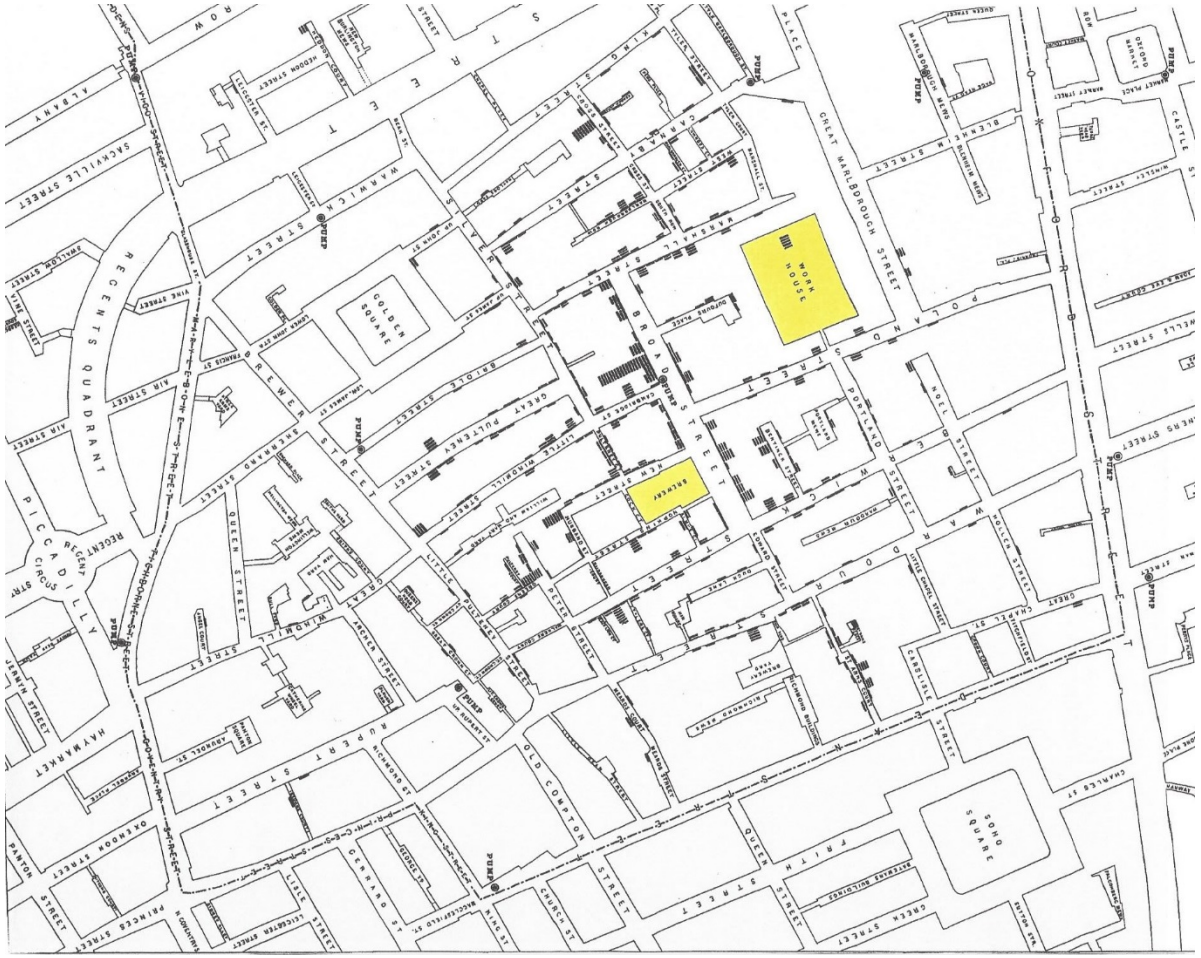
Professional Techniques – T32

COMMUNICATING THE COMPLIANCE MESSAGE TO THE BUSINESS: WHY DESIGN MATTERS

LONDON IN 1854

The Great Cholera Epidemic of 1854



How One Scientist Saved Hundreds of Lives

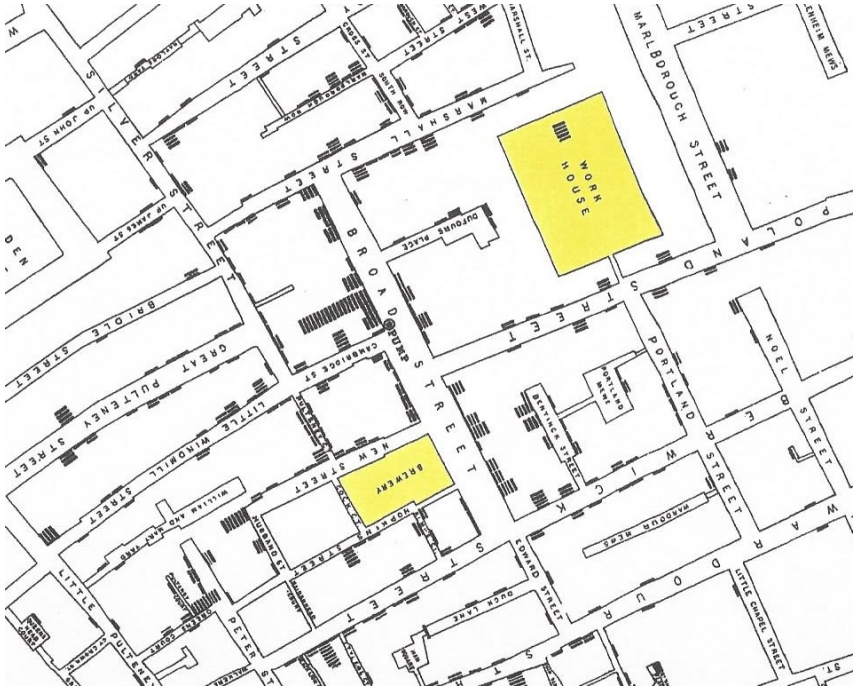
- One Good Idea
  - Causal theory about how the disease spread
  - Mapping earlier epidemics produced link between different water supplies and cholera rates

And a Good Method

1. Placing data in appropriate context for assessing cause and effect
2. Making quantitative comparisons
3. Considering alternative explanations and contrary cases
4. Assessment of possible errors in the numbers reported in graphics

The Methodology in Action

1. The graphical display painted the picture
2. Why the brewery and the workhouse were spared
3. Delicacy of taste, and devastating side effects
4. Details backed up the map



TODAY….THINGS AREN'T MUCH DIFFERENT

Message Delivery is Nine Tenths

- Impression
  - Confidence
  - Professionalism
- Persuasion
  - Compelling and provocative
- Efficiency
  - Platform for flexible and robust analysis

Message Delivery is Nine Tenths

- Clarity
  - Very complex information
  - Non-technical audience
- Accuracy
  - Reduce user frustration due to errors and inconsistencies
- Productivity
  - Sound development
  - Streamline use

In Short….

- Superior methods of data design are more likely to produce truthful, credible and precise findings

- The difference between excellent analysis and a faulty one can sometimes have momentous consequences

Some Rules of Engagement

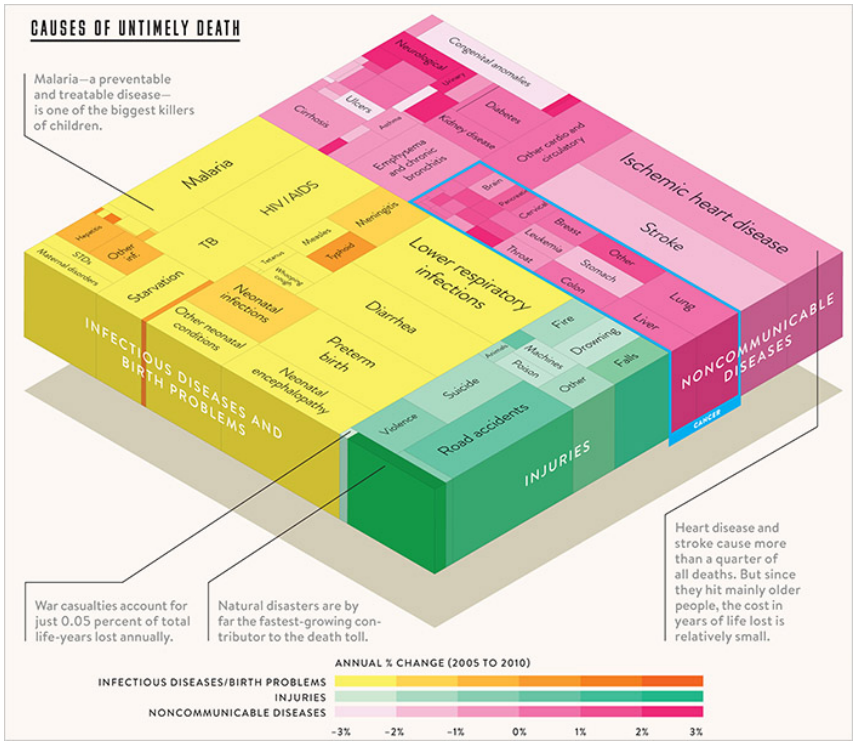
- Data needs to assess cause and effect – this is at the basis of analytical thinking
- Data needs to answer the question – compared with what?
  - ***That is, quantitative comparisons should be made***
- Alternative explanations and outliers should be considered and explained
- Data error should be assessed and reviewed

SOME NOT SO OBVIOUS BASICS

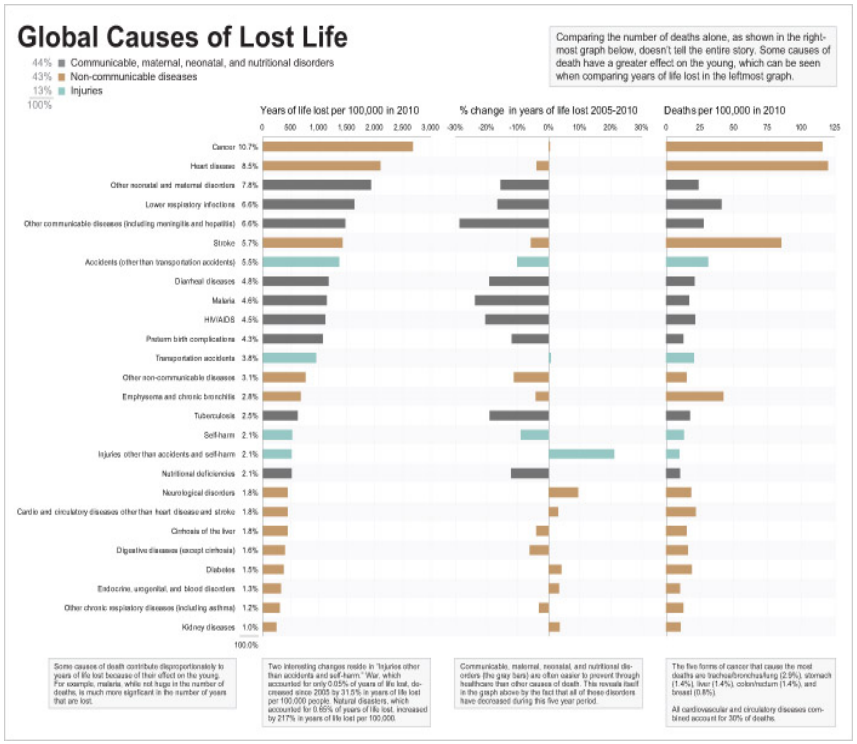
COLOR – WHY IT MATTERS

Color and Style Matter

Can you tell what's going on here?



More straightforward visual



The Provocation of Color

- Very strong colors
  - Helpful when used sparingly
  - Unbearable if used with a heavy hand
- Know when to use bright colors
  - To draw attention
  - Usually mean something bad happened
- Know when to use subtle colors
  - To quietly draw the eye to certain parts of the analysis
  - Delineate one data display from another

The Provocation of Color

- Subtle colors
  - Calming effect of subtle colors – pale yellow, navy blue
  - Use colors that are most prevalent in nature – grays, subtle greens and blues, yellow, browns
  - These natural colors should be the baseline
- Stronger colors
  - Use for small highlights to specific data points
  - Achieves an overall effect of calm restraint
  - Provides a professional visual quality

AND A WORD – OR TWO – ABOUT… WORDS

Consider….

Joseph Albers wrote:

"Ophthalmology has disclosed that the more the letters are differentiated from each other, the easier the reading."

What the….Font?

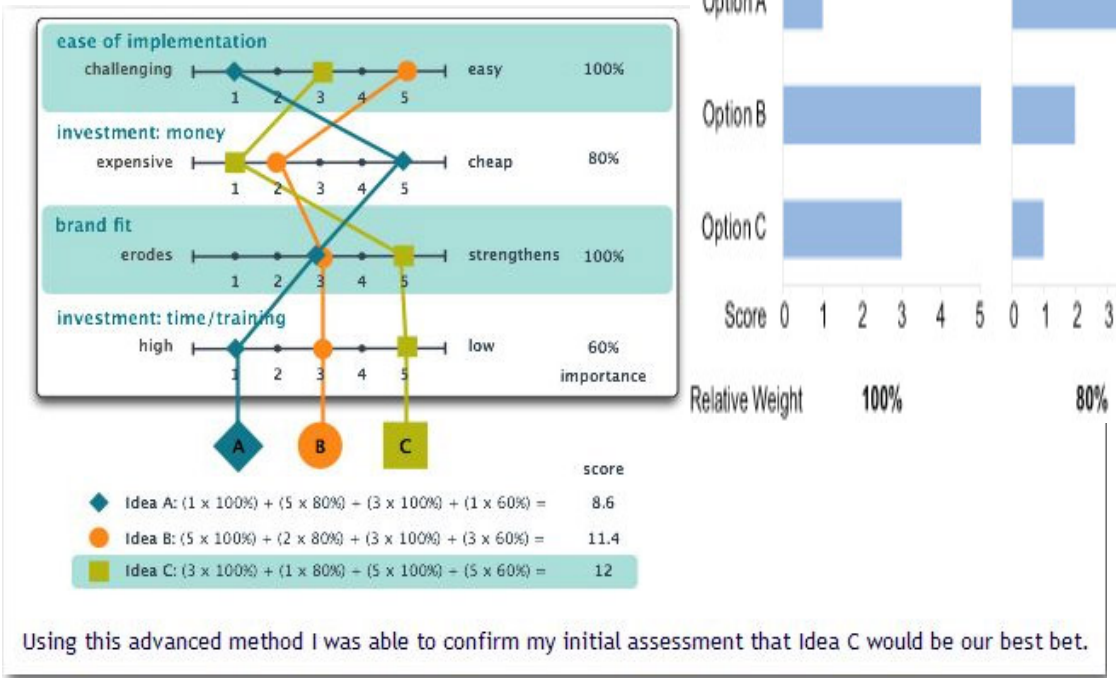
- Font should match the culture of the organization and be tailored to the audience
  - Traditional - Times New Roman, Ariel
    - Old School and overused, perhaps, but still appropriate for certain audiences
  - More modern choices: Garamond, Gill Sans, Calibri, Cambria,
  - Less appealing choices - Comic Sans, Papyrus
    - Lack professional polish and may not bode well with more conservative audiences

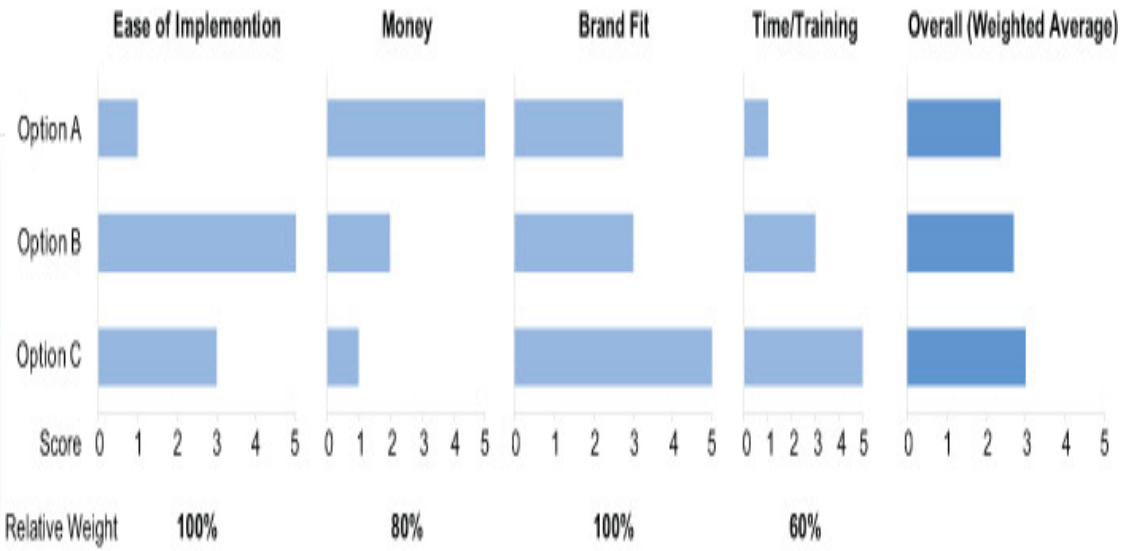
MORE THAN MERE WORDS CAN EXPRESS

Your Audience Won't Be As Into the Data as You Are

Seriously?

Easy to see that C, or B, would be a good choice





Using this advanced method I was able to confirm my initial assessment that Idea C would be our best bet.

Pictures Speak Volumes – When Done Well

- Use a proper layout
  - Charts and graphs should be wider than they are tall
    - rectangular in shape
- Choose graphs that are:
  - Clear
  - Simple in design
  - Appropriate for the question being asked/ answered

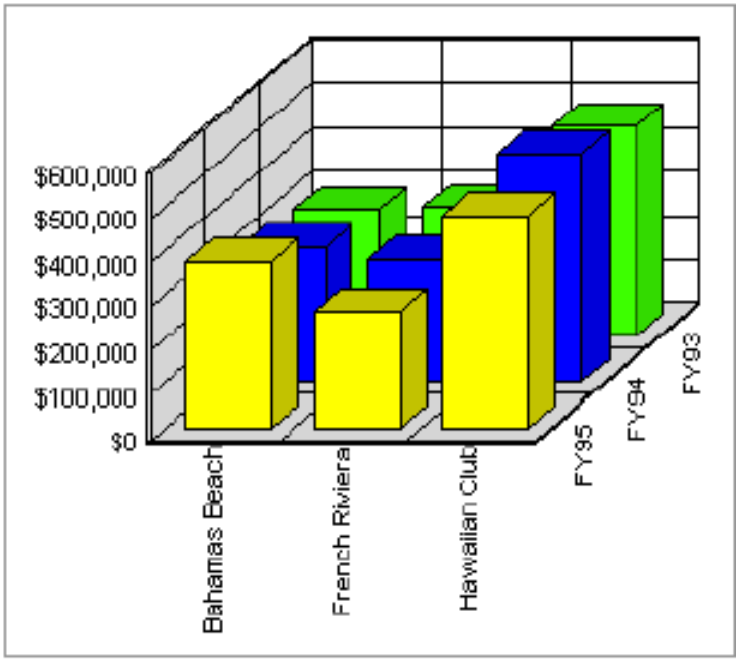
What's the Objective?

The main question we should strive to answer through a combination of charts/graphs accompanied by words is:

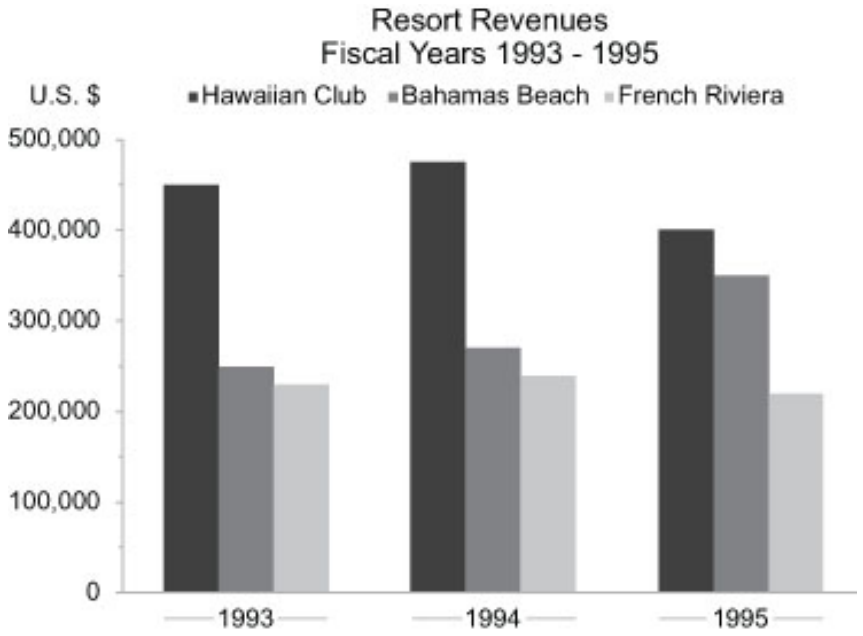
Compared with What?

Efficiency: Make the Decision Easy

No quick decision will be made on this graph…



Very easy to see the growth is in the Bahamas…



CHALLENGER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What Happened

- Recap
  - An analysis was completed by the engineers
  - Engineers recommended not to launch the Challenger
  - Recommendation was right
  - It was ignored by senior management
    - At the time it was not seen as convincing enough

WHY?

The data presented failed to effectively answer the question:

Compared with what?

No "Good Method" Employed

- Analysis Failures:
  - No focus on the link between temperature and O-ring failure
  - Engineers clouded the analysis with too much extraneous and irrelevant information
  - Users of the analysis would have been forced to come to grips with all of this data before even being able to consider the core question
  - All of this muddied the waters and inhibited clarity of cause and effect

You're saying…..wait, what are you saying?

HISTORY OF O-RING DAMAGE ON SRM FIELD JOINTS

	SRM No.	Cross Sectional View: Erosion Depth (in.)	Cross Sectional View: Perimeter Affected (deg)	Cross Sectional View: Nominal Dia. (in.)	Top View: Length Of Max Erosion (in.)	Top View: Total Heat Affected Length (in.)	Clocking Location (deg)
61A LH Center Field**	22A	None	None	0.280	None	None	36°--66°
61A LH ~~CENTER~~ FIELD**	22A	NONE	NONE	0.280	NONE	NONE	338°-18°
51C LH Forward Field**	15A	0.010	154.0	0.280	4.25	5.25	163
51C RH Center Field (prim)***	15B	0.038	130.0	0.280	12.50	58.75	354
51C RH Center Field (sec)***	15B	None	45.0	0.280	None	29.50	354
41D RH Forward Field	13B	0.028	110.0	0.280	3.00	None	275
41C LH Aft Field*	11A	None	None	0.280	None	None	--
41B LH Forward Field	10A	0.040	217.0	0.280	3.00	14.50	351
STS-2 RH Aft Field	2B	0.053	116.0	0.280	--	--	90

*Hot gas path detected in putty. Indication of heat on O-ring, but no damage.
**Soot behind primary O-ring.
***Soot behind primary O-ring, heat affected secondary O-ring.

Clocking location of leak check port - 0 deg.

OTHER SRM-15 FIELD JOINTS HAD NO BLOWHOLES IN PUTTY AND NO SOOT NEAR OR BEYOND THE PRIMARY O-RING.

SRM-22 FORWARD FIELD JOINT HAD PUTTY PATH TO PRIMARY O-RING, BUT NO O-RING EROSION AND NO SOOT BLOWBY. OTHER SRM-22 FIELD JOINTS HAD NO BLOWHOLES IN PUTTY.

Analysis Failures

- Used a mass of acronyms such as SRM
  - Used up to 3 different names for a particular rocket
    - A NASA number,
    - Thiokel's number,
    - Launch date
  - Too many descriptions were used for O-ring damage
    - Erosion,
    - Soot,
    - Depth,
    - Location
  - Colloquial words were used that might not have significant meaning for the users of the charts
    - What exactly is "blow by"?

An Improved Visual

- Better depictions:
  - Simple scatter plot
  - Showing O-ring damage against temperature
  - List showing
    - Flights,
    - Dates,
    - Erosion incidents
    - Temperature
- A clear display of evidence would have spoken for itself

Maybe Something That Looked Like….

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Clocking location of leak check port

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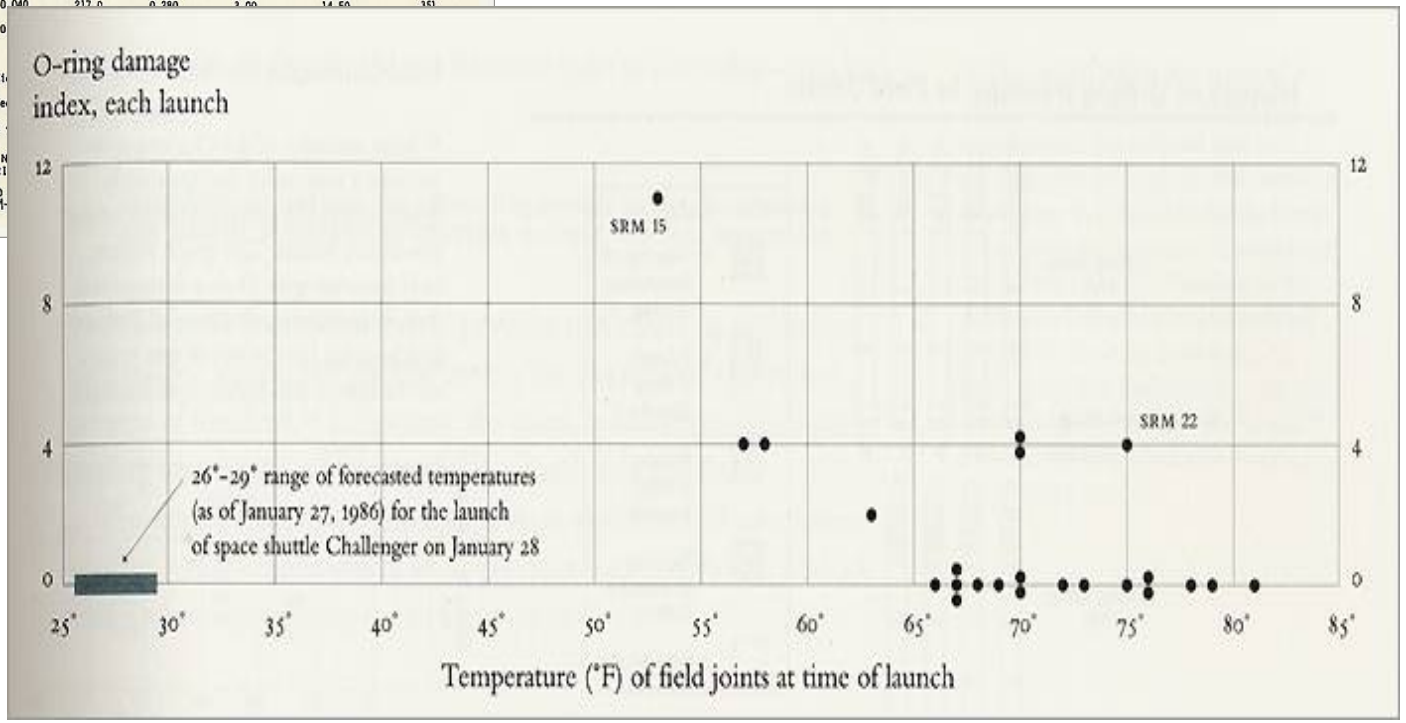
NEAR OR BEYOND THE PRIMARY O-RI

SRM-22 FORWARD FIELD JOINT HAD
AND NO SOOT BLOWBY. OTHER SRM-



PUTTING IT ALL TOGETHER

In Short

- Information displays should be:
  - Documentary
  - Comparative
  - Casual and Explanatory
  - Quantified
  - Multivariate
  - Exploratory and Skeptical

Still True in Today's Cyber World

Tufte:

"Graphical elegance is often found in simplicity of design and complexity of data."

How do we achieve this?

Combine Words and Pictures

- Charts and graphs should be accompanied by:
  - Title
  - Legends
  - Written explanations
- Integration increases information density
- All that we need to know is presented on one page
- Avoids flipping back and forth between words and graphics which can be distracting and confusing

Closing Thoughts

- There are right ways and wrong ways present information to your business partners
  - Some displays reveal the truth and displays that do not
- Analytical displays should answer the question at hand
  - Directly and in as straightforward manner as possible
- Quality of design is a reflection of intellectual clarity and strength

Fun with Visualization

- http://www.businessinsider.com/the-27-worst-charts-of-all-time-2013-6#

- http://www.perceptualedge.com/

QUESTIONS?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