Design Presentation Guidelines and Tips

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Key Elements of a Technical Presentation

1) Organization

2) Visual Aids (What's on the PPT Slide)

3) Delivery

Hall D, 2005, http://www.ece.utah.edu/speaking_resources , accessed 11-28-2012.

Organization

- Organize the talk to "tell a story"
  - Provide background and motivation while defining the problem
  - Explain your approach to solve the problem, why did you chose it?
  - Explain your results and what they mean (tie this back to the background)
  - Explain what you will do next

What's on the PPT Slide
General Info

- Use one (maybe two) key messages per slide
- Target roughly one minute per slide
- Keep slide as simple as possible
- Use figures!
  - e.g. Graphs, flow charts, tables, diagrams, schematics, pictures
- Keep a consistent look/format throughout
  - e.g. Titles, bullets, font color/size

What's on the PPT Slide
Text and Bullets

- **Use the "6 x 6" Rule[1]**
  - 6 words per line, 6 lines per slide
- **Use short phrases, not complete sentences**
- **Capitalize first word in bullet**
  - Not All Words
  - NEVER ALL CAPS
- **Be consistent with bullet sentence structure**
  - e.g. active noun or verb first
- **Avoid Wordiness**
  - No parking structure will be considered if the cost per stall to erect the structure is greater than $11,000[2].
  - Parking structures will cost < $11K/stall

[1]**Population Reference Bureau, 2003,** http://www.prb.org/pdf/ConnectingPeopleSect3.pdf
[2]**Hall D, 2005,** http://www.ece.utah.edu/speaking_resources , accessed 11-28-2012.

Chilean Exports

- Fresh fruit leads Chile's export mix - Chile emerges as major supplier of fresh fruit to world market due to ample natural resources, consumer demand for fresh fruit during winter season in U.S. and Europe, and incentives in agricultural policies of Chilean government, encouraging trend toward diversification of exports and development of nontraditional crops - U.S. Dept. of Agriculture, Economic Research Service Report

- Chile is among the developing economies taking advantage of these trends, pursuing a free market economy. This has allowed for diversification through the expansion of fruit production for export, especially to the U.S. and Western Europe. Chile has successfully diversified its agricultural sector to the extent that it is now a major fruit exporting nation. Many countries view Chile's diversification of agriculture as a model to be followed.

- Meanwhile, the U.S. remains the largest single market for Chile's fruit exports. However, increasing demand from the EC and Central and East European countries combined may eventually surpass exports to the U.S., spurring further growth in Chile's exports.

- If you've read this far, your eyes probably hurt and you've been reading this tedious long-winded text instead of listening to me. I'm insulted- can't you see I'm doing a presentation up here? Look at me! Congratulations, however, on having such good eyesight.
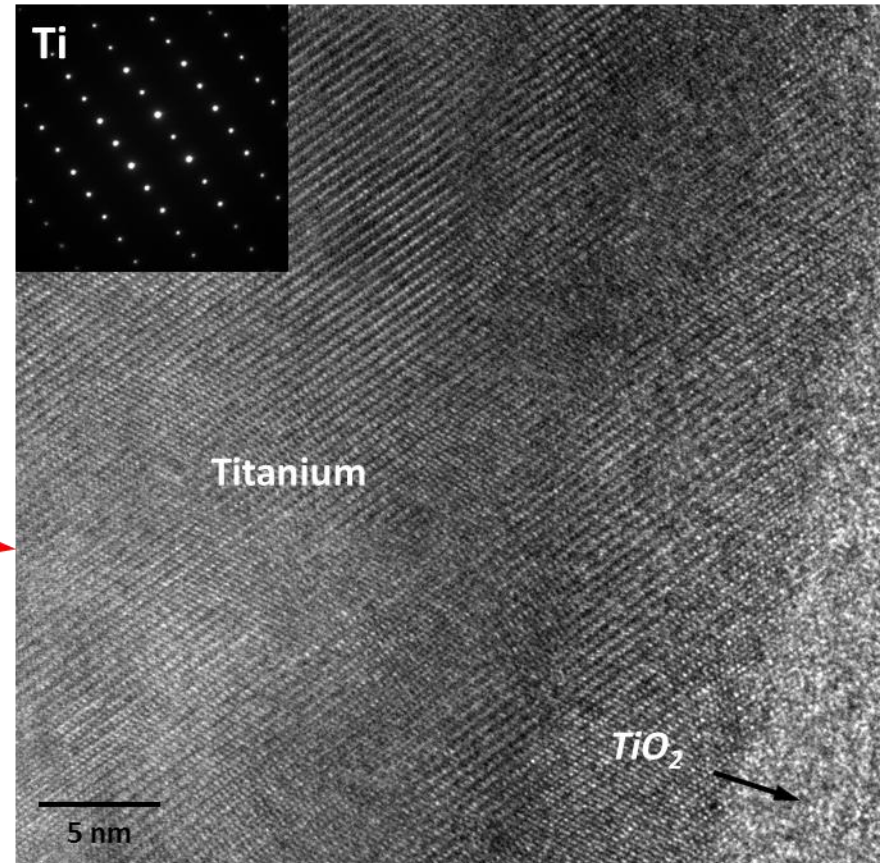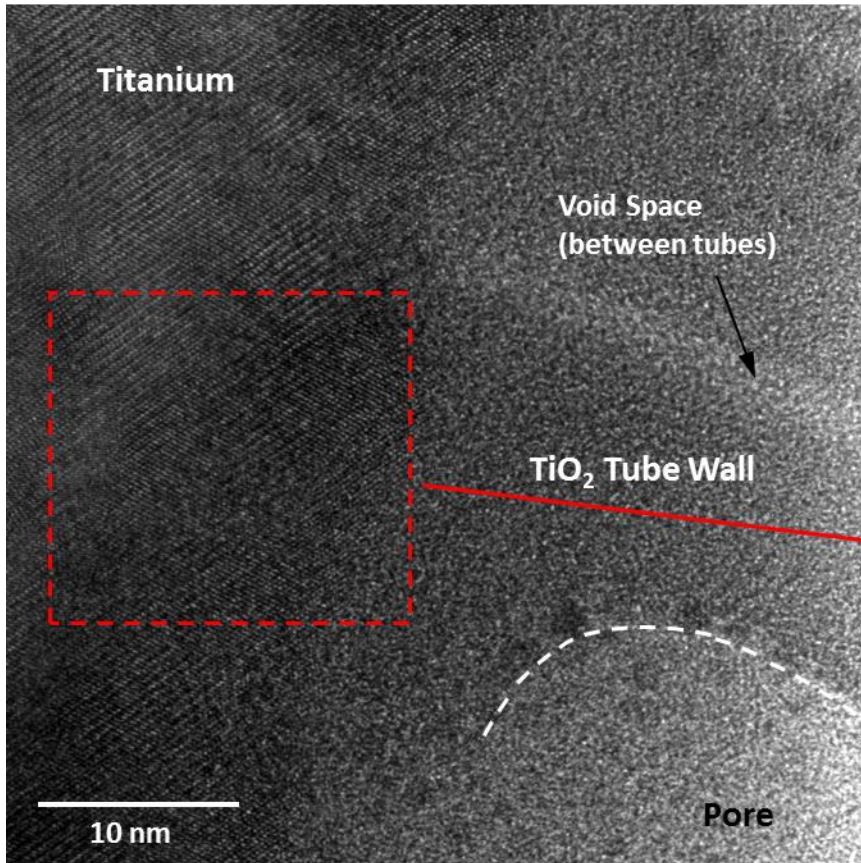
Composition
Figures
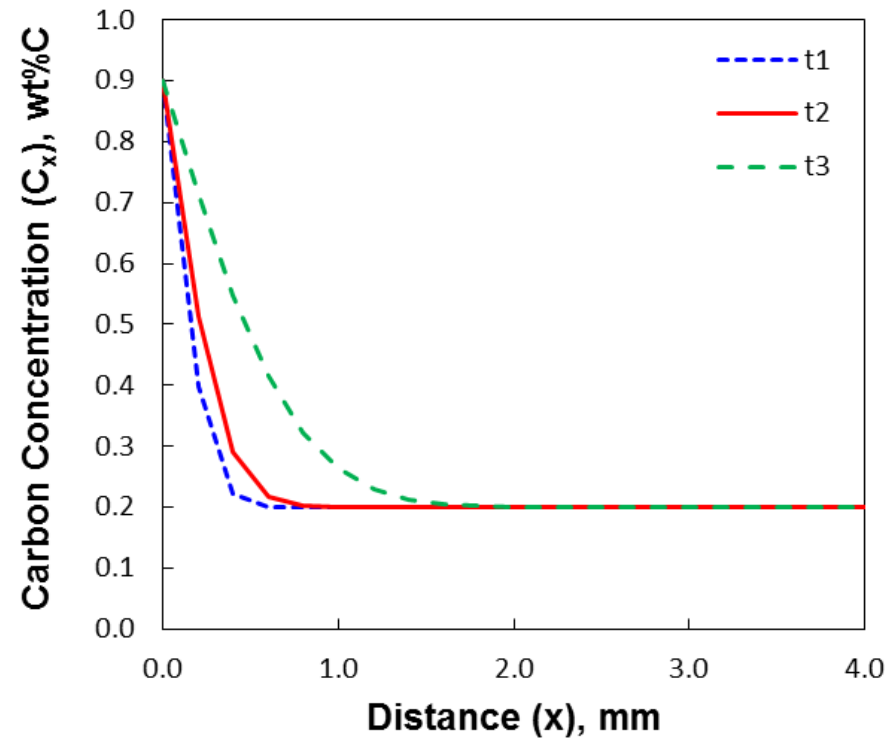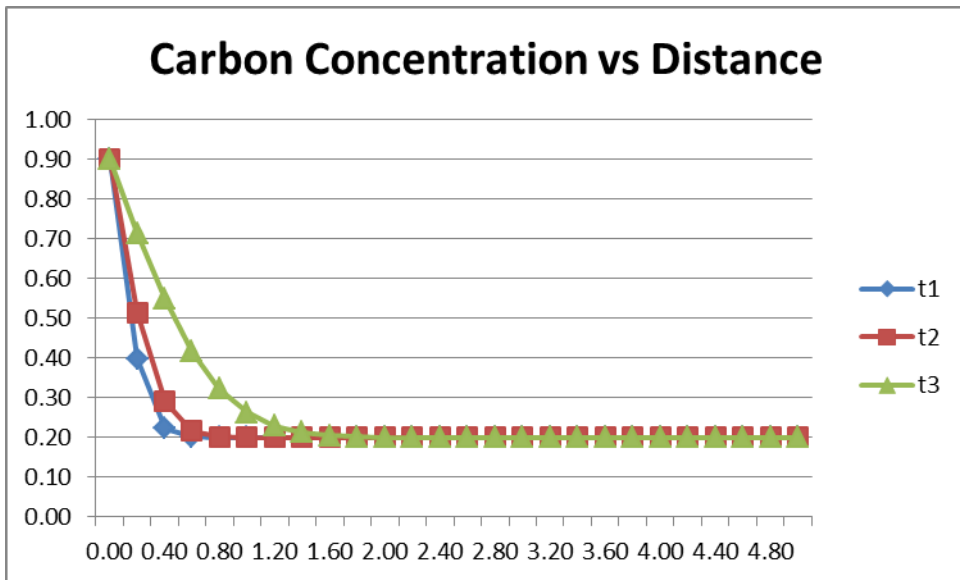
Composition
Optical, SEM, TEM Images
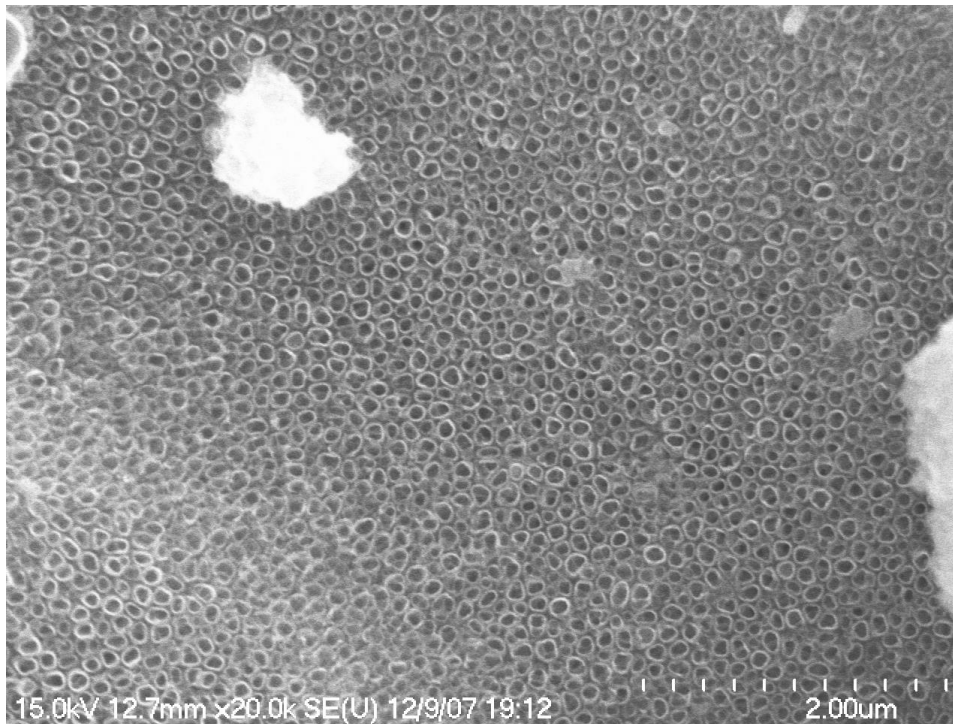
- Always provide a scale bar

- Always label important features (legibly)

- Provide clear explanation (what is it? What is the point?)

Crawford GA, J Mater Res 24 (2009) 1683-1687

Composition
Micrographs

What not to do…..

Composition
Font Size/Color

Fonts Will Make or Break a Presentation

- Use legible font sizes

- Use appropriate color combinations

36-40 point Title

28 point Heading

24 point Sub-headings (bullets)

14-18 point References and Labels

Avoid using 10 point font or smaller

Hall D, 2005, http://www.ece.utah.edu/speaking_resources , accessed 11-28-2012.

Beginner Motorcycles

- My personal favorite: the Suzuki Savage
- Light weight (~380lbs)
- Adequate power (650cc engine)
- Low seat height fits most riders

Composition
References

- You should reference:
  - Quotes, statistics, figures, graphs, statistics, pictures, charts, codes, facts…etc

Kukobo et al.[1]

www.zimmer.com

[1]Kukobo, T., et al., Biomaterials 24 (2003) 2161-2175

WHAT'S ON THE PPT SLIDE
BACKGROUNDS AND ANIMATION

❖Keep it simple!

Use backgrounds…

…..and animation

…..only when they …..

……   add value!!!!!

Otherwise it can be……

…..DISTRACTING!!!!

Delivery

- Speak clearly, sound fresh and energetic
- Be a "*polished version of yourself*"
- Be "*Somewhat bigger than in ordinary life*"
- Try to look and sound natural/human (not robotic)
- Be professional….not too conversational
- Develop controlled and planned body movements
- <u>Do not read the slides</u>
- Connect with the audience…eye contact

Hall D, 2005, http://www.ece.utah.edu/speaking_resources , accessed 11-28-2012.

Delivery

- Remember to make your audience understand - so talk that way.
- Use a pointer - but don't make people seasick
- Slide transitions are important! (review/preview)
- Be prepared
  - Know your equipment
  - Know the room (visit in advance)
  - Know what to say before, during and after - Practice is important

References

- Hall, Damon, CLEAR Engineering Oral Consultant, ECE Department, University of Utah, "A guide to Technical Presentations", 2005, http://www.ece.utah.edu/speaking_resources, accessed 11-28-2012.

- Population Reference Bureau, "Section 3: Presentation Dos and Don'ts: Tips for Preparing Great Slides", 2003, http://www.prb.org/pdf/ConnectingPeopleSect3.pdf, accessed 11-28-2012.

ATI Update

Item	Status	File
Background		▶
Project Statement and requirements	Updated 9/21/18	▶
Design Approach and Tasks		▶
Schedule Update	• Behind schedule, cat ate homework	▶
Monthly Goals	• Goal 1 good, goal 2 bad, etc.	
Progress Update		▶

Background

- ATI is one of the largest specialty metals companies in the world.
  - **Revenue:** $3.5B
  - **Industries:** Aerospace, defense, <u>oil and gas</u>, chemical processing.
  - **Metals:** Ti alloys, <u>Ni alloys/superalloys</u>, stainless and specialty steels, other alloys (Zr, Hf, Nb, W).

- ATI produces various Ni alloy components for oil and gas industry including Inconel 718 bolts.

- Subsea Inconel 718 bolts are failing, <u>most likely due to environmentally assisted cracking</u>.
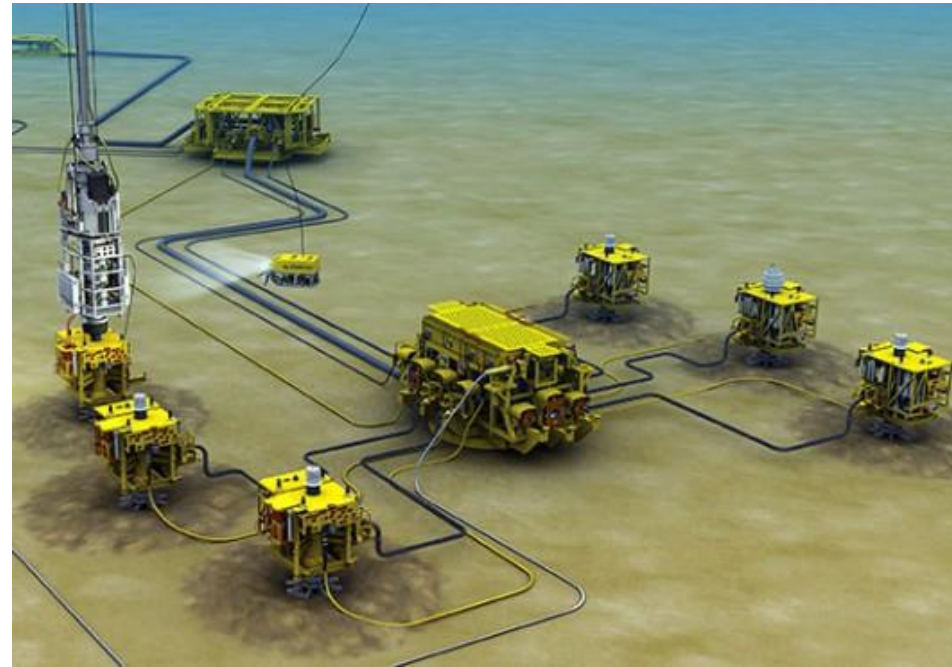
"Failures of fasteners [bolts] could result in oil spill on the scale of Deepwater horizon disaster", WSJ.[2]

[1]*http://subseaworldnews.com*

[1]http://subseaworldnews.com/2014/04/29/ge-pemex-and-imp-sign-collaboration-agreement/
[2]Mann, T., U.S. regulators Warn Drillers to Find Solution to Subsea Bolt Failures, Wall Street Journal, 2016

Design Methodology

Problem Statement

Develop a low-cost screening method for subsea corrosion that costs less than $100/test, performed by a laboratory technician, to predict service life of bolts made of UNS N07718 for Allegheny Technology Incorporated (ATI).

Customers and Stakeholders

- ATI, MET Dept. (SDSMT), ATI Design

Requirements

- Testing cost: <$100/test
- Time: TBD
- HR Requirement: Performed by laboratory technician
- Infrastructure: TBD
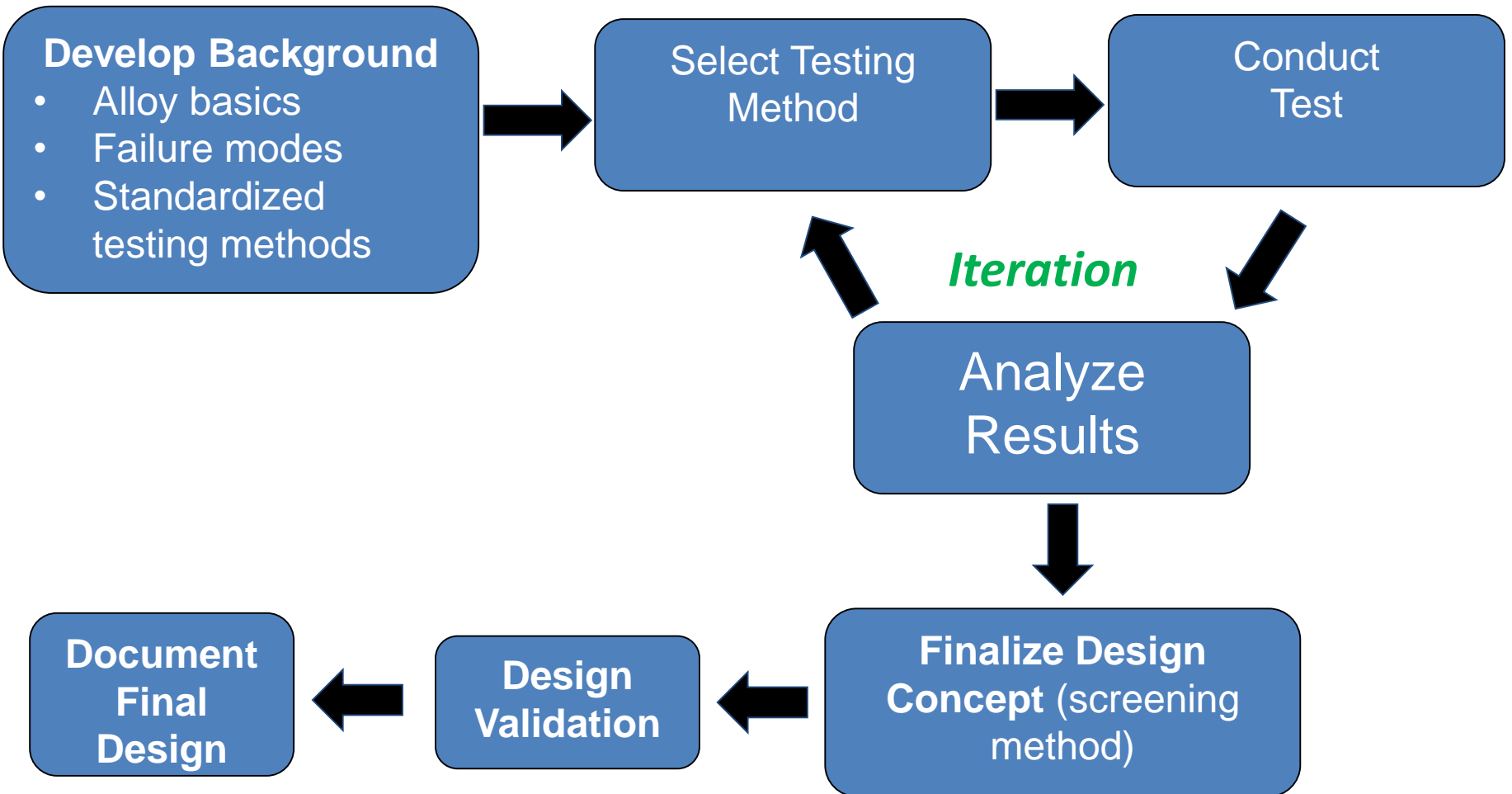
Design Methodology – Constraints/Risks

- **Constraints**
  - $500 operating budget
  - Constrained to use of existing MET Dept. equipment
  - 2 hrs of testing time per student per week
  - Project completion date: April 18th, 2017
- **Risks**

Risk	Mitigation Plan
Fail to receive material from ATI.	Purchase suitable material.
Inability to complete test due to infrastructure constraint.	Develop 3rd party testing plan.
Testing does not provide meaningful results.	Develop _iterative_ design approach.
Failure to meet design objectives/requirements.	Continuous progress against schedule checks → refine scope as needed.

Design Methodology - Design Approach

Develop Background
- Alloy basics
- Failure modes
- Standardized testing methods

→ Select Testing Method → Conduct Test

Iteration

Analyze Results

Finalize Design Concept (screening method)

Design Validation

Document Final Design

Design Tasks and Status

| Task	Due Date	Status/comments
Refine project scope	10/15	Completed
Acquire samples	10/31	Ongoing, samples at 3rd party for machining, ECD~11/15.
Literature Review	10/14	Ongoing, stage 1 complete. Next step?
Identify first testing/screening method	?	Completed, ASTM G129
Analyze ATI samples (microstructure/hardness)	2/28? ?huh?	Ongoing, awaiting samples.
Define ASTM G129 testing methodology (e.g. how to encourage hydrogen uptake)	?huh?	Ongoing, system identified. Considering electrochemical method for hydrogen uptake.
Conduct ASTM G129 test and analyze results	2/28? ?huh?	TBD
MILESTONE: Decision point, continue with ASTM G129 or select/define new testing method.	?	TBD

Recent Activities/Progress

Develop Background - Inconel 718 Basics

- Inconel 718 (UNS N07718) is commonly used in subsea applications

  – Excellent corrosion resistance; High strength

- Precipitation hardenable Ni-Cr-Fe alloy – FCC crystal structure

- Primary strengthening from γ" precipitates (Ni_3Nb)

  – Coherent, disk shaped, BCT precipitates

- Excellent corrosion resistance→ passive Cr_2O_3 layer

Element	Ni	Cr	Fe	Nb	Co	Mo	Ti	Al	C	Mn	Si
Composition Range (wt%)	50-55	17-21	bal	4.75-5.5	1.0	2.8-3.3	0.65-1.15	0.2-0.8	0.08	0.35	0.35

Develop Background - Heat Treatment of Inconel 718

- Solution Treatment: 1021-1052°C, 1-2.5 h

- Aging: 760-802°C, 6-8 h
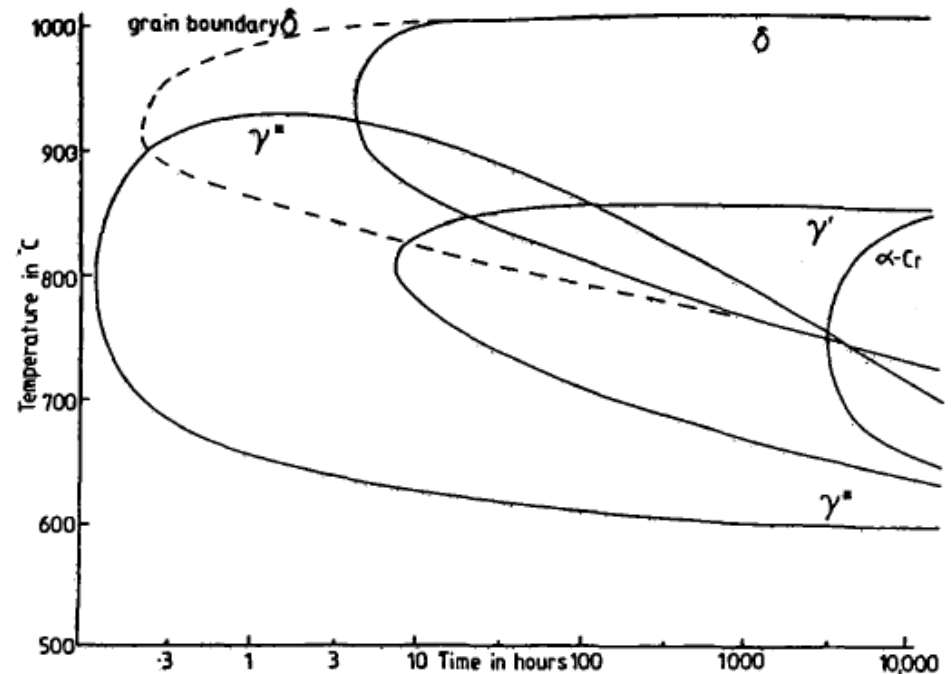
Inconel 718 Time-temp-precipitation diagram.[1]

- Primary strengthening from γ'' precipitates (Ni_3Nb).
- Acicular grain boundary δ precipitates (Ni_3Nb) significantly reduce ductility and susceptibility to hydrogen embrittlement.
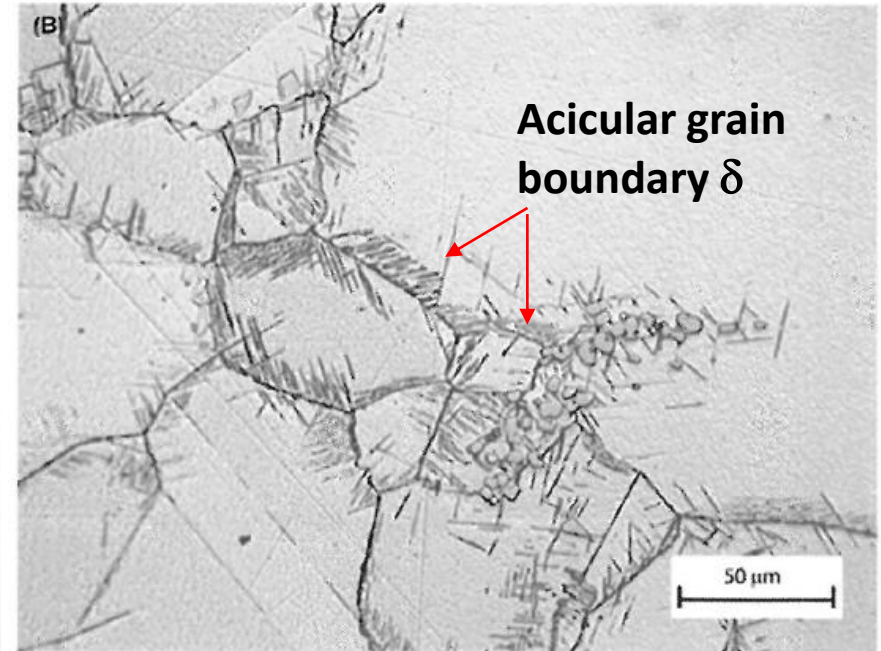
[1]Heat Treater's Guide: Nonferrous Alloys, Inconel 718, ASM International, 1996.

Develop Background - Heat Treatment of Inconel 718

- Microstructure analysis often employed to determine if 718 alloy meets specification (e.g. API standard)

Limited acicular grain boundary δ

Acicular grain boundary δ

50 µm

50 µm
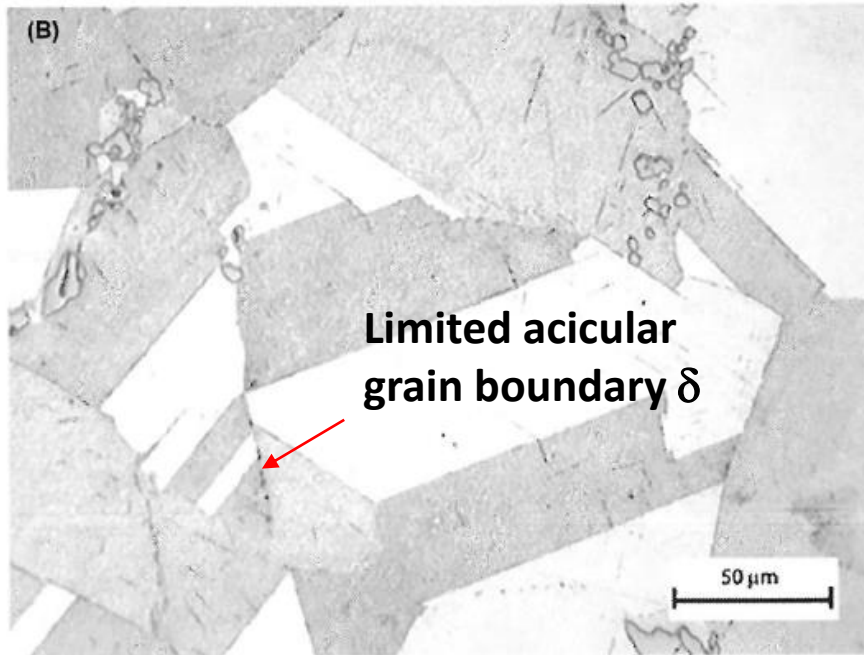
Acceptable

Unacceptable

[1]API Standard 6ACRA, 1st Ed, American Petroleum Institute, 2015.

Develop Background - Current Specifications

- Existing Inconel 718 subsea bolts are specified using the API Standard 6ACRA[1].
  - Tensile
  - Hardness
  - Macroetch
  - Micrograph Analysis
  - Grain Size analysis
  - Charpy Impact
- Parts meeting the API specification are still failing.
- Thus, there is a need for a new screening method to identify parts that are susceptible to failure in service.

[1]API Standard 6ACRA, 1st Ed, American Petroleum Institute, 2015.

Select Testing Method – ASTM G129

- Selected ASTM G129 "Slow Strain Rate Testing" as first testing method to base design.

- ASTM G129 is an accelerated screening method often used to evaluate EAC.

- Involves uniaxial tensile testing of a specimen in a selected solution under a slow strain rate. Sample loaded until failure.

- Testing chamber identified.

[1]ASTM G129, ASTM International, West Conshohocken, PA, 2013.