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May 2018

Collaborative Writing, Persuasion, and Proposals

“You persuade a man [people] only insofar as you can talk his [their] language by speech, gesture, tonality, order, image, attitude, idea, identifying your ways with his [their ways].”

–Kenneth Burke



Learning Objectives

By the end of this module, you will have a basic understanding of the following:

- Collaborative writing
- Audience and purpose
- How to write proposals
- The differences between executive summaries & abstracts
- Silliness in engineering
- How to submit your documents



Benefits of Team Writing

- Better documents
- Enhanced creativity
- Improved interpersonal skills and increased confidence
- A better understanding of your composing process and of how others compose
- A better understanding of how you and others solve problems
- Lasting friendships/enemies



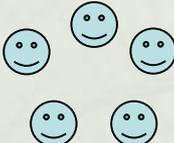
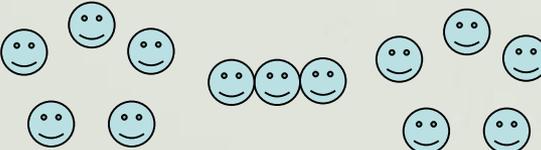
Drawbacks of Team Writing

- Would you prepare plans for a house like this? What's the predictable outcome?
- Lack of unified style, format, organization, theme.
- Disagreement about content and omitted material.
- Lasting enemies.





Team-Writing Processes

Approach	Description	Comment
Team Composing 	2 or more writers plan, draft, revise, and edit together	Useful for short pieces, to pool resources, and to achieve consensus
Single File 	Different individuals plan, research, draft, revise, and edit	No opportunity for team interaction or critical review
Blended 	Mix of above such as collaborative planning and revising, and individual drafting	Combines efficiency with benefits of collaboration





Analyze Your Audience

- **P**ower (subordinates, peers, supervisors)
- **A**ge (vision, crystallized vs. fluid intelligence)
- **N**eeds/Values (money, environs, health, politics, info)
- **E**xpertise (high, moderate, low, mixed)

PANE+E

- **E**thics (honesty, credibility, accuracy)



Persuasive Appeals

➤ How to persuade your readers:

- Appeal to logic or reason (***logos***)
 - Appeal from your credibility (***ethos***)
 - Appeal to emotions, concerns, fears, desires, values (***pathos***)
-
- Your proposal should mainly be based upon the first two approaches: via logical argument and well-supported research (i.e., logic and facts).
 - Occasional use of *pathos* can be effective (i.e., concern for health, access, safety, or the environment): via stories and examples.



Ask Questions

Who Is Your Audience?

- Who will read this document? Technical experts? Administrators? Business people?
- Why will they read it? What motivated them to request the document? What actions will they take based on this report?
- What information have they requested? Are their instructions clear or do they need clarification?
- How well informed are they about the subject? How much background information is required? Are they familiar with technical terminology?
- What information do they need? Do you have all the information needed to address their concerns? If not, what do you need to find out and how will you do so?



Ask Questions

What Is Your Purpose?

- What do you hope to accomplish by writing the proposal?
Can you write a clear, concise statement of purpose?
- How do your goals relate to your reader's expectations?
Do they share your objectives? If not, what are the points of disagreement?
- How can you meet both your goals and your reader's expectations? What do you know that they do not and how can you make them aware of it?
- What attitudes or values do they have that must be taken into account?



Proposal Considerations

➤ Audience

Andrew, Steve, TAs, (External Funders?)

Financier/Accountant, HR Manager, Senior Engineers

➤ Purpose

To persuade us that you have the **expertise**, the **finances**, the **facilities**, the **team**, and the **plan**



Letter of Transmittal

- Who are you?
- How can you be contacted?
- What is the purpose of the attached document?
- What are you proposing to do?
- What are the benefits?



Proposal Content

- Letter of transmittal
- Title page
- Executive summary
- T of C, (L of F, Glossary)
- **Introduction (include high level graphic)**
- Explanation of key elements of proposal (**scope**)
- **Analysis of the need, the market, and the competition**
- **Budget (include both expenses and income)**
- **Time schedule (Gantt and Milestone charts or PERT chart)**
- Description of team and roles (or resumes as appendix)
- **Conclusion**
- References

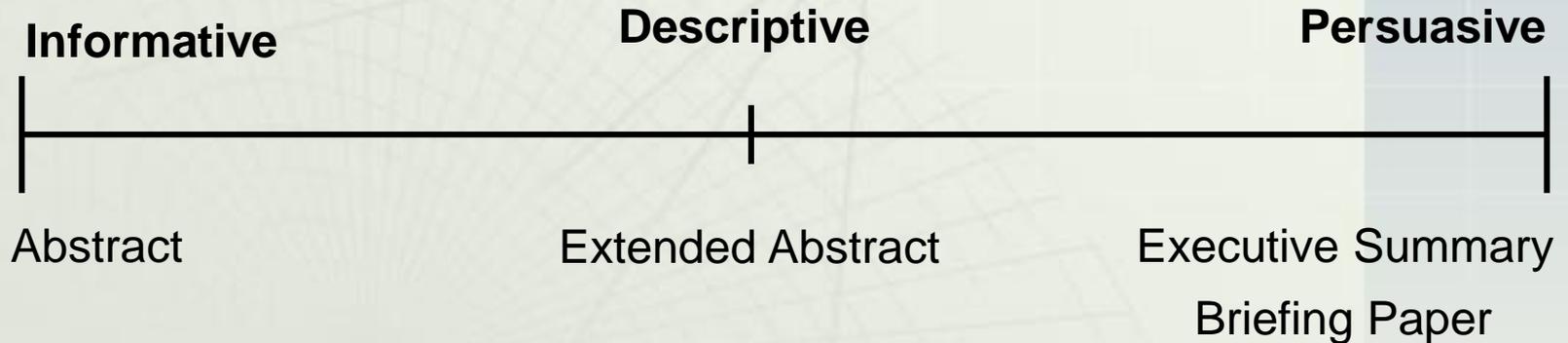


Front Matter

- Title Page (the usual material: title, name of company, authors, date, affiliation)
- Executive Summary (outlines the content of the document in a single page – can be explicitly persuasive – see following slides)
- Table of Contents (two levels only)
- List of Figures or Tables (usually you don't include enough figures and tables to need lists for your proposal)
- Glossary (only include if you have many technical terms that would need to be defined for the lay reader)



Continuum of Abstracts/Executive Summaries



A Liquid-Filled Buoyancy-Driven Convective Micromachined Accelerometer

Lin Lin and John Jones

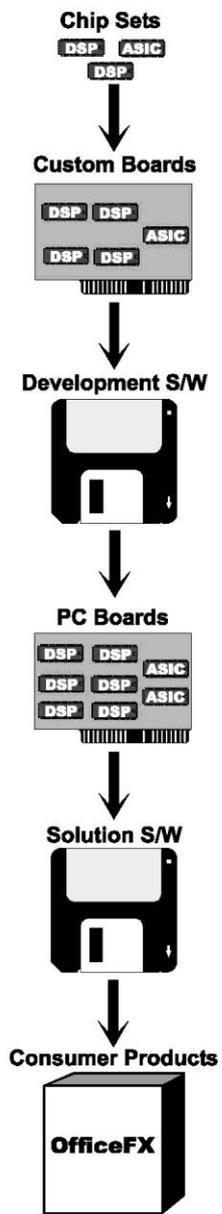
Abstract—A novel class of accelerometer, based on the buoyancy of a heated fluid within a micromachined cavity, has previously been developed and reported. Based on dimensional analysis and computational modeling, it is predicted that the sensitivity of the accelerometer can be increased by several orders of magnitude over previously reported results by choosing a suitable liquid as the working fluid, though this increased sensitivity comes at the cost of an increased response time. A liquid-filled accelerometer is constructed; its sensitivity and response time are measured, and shown to be consistent with theoretical predictions and with the results of finite-element analysis. It is noted that the existing literature provides no basis for predicting the effect of Prandtl number on the sensitivity and response time of the accelerometer. The prediction of response time requires analysis of the transient response of the heated fluid to a sudden acceleration. This is a novel problem: previous studies of transient convection have focused on the effects of a newly imposed temperature differential in an existing gravity field, rather than a newly imposed acceleration on an existing thermal field. An approximate expression for response time as a function of radius ratio and Prandtl number is developed by curve-fitting to the results of FLOTRAN simulation.

Index Terms—Accelerometer, buoyancy, natural convection



Example Executive Summary

See the .pdf file on course website for embedded comments.



Leveraging Our Value-Added A Summary of the 1995 Business Plan for Spectrum Signal Processing Inc.

Prepared by Glenn Mahoney, MSAT 94/95
March 20, 1995

From DSP chip sets to DSP-based consumer products, Spectrum delivers superior value to our customers through world leadership in the application of DSP technology. At each of the following stages in our use of DSP technology, we will add value and derive revenue:

- Selection and integration of core DSP chips, and design and production of DSP enabling ASICs,
- Design and production of custom, development, and off-the-shelf boards,
- Creation of development and solution software.

Spectrum's plans and organizational structures reflect the stages in our DSP value-chain with identification of three markets:

- **COMPONENTS** – DSP chip sets and proprietary interface chips with enabling software,
- **INDUSTRIAL** – Custom and general purpose DSP boards with development and specialized software,
- **DESKTOP** – General purpose PC boards (audio, telephony, and video) with integrated, multi-function software.

Our involvement in these layered markets allows Spectrum to maximize the revenue we obtain by leveraging the effort we make in lower-level development (Components) to create services, capabilities, and products at higher levels (Desktop). The difference in these markets are not just the products we bring to them; the gross margins vary from 55% for the industrial market to 35% for the desktop. Each market is addressed separately and in detail by the full business plan.

Shared direct sales forces and OEMs are the channels utilized in the component and industrial markets. For our desktop products, direct sales are replaced with links to national computer retail chains. The OEM channel is our favored channel, and we will maintain strategic partners in each market. These partners are a key to our success as they – through their customers – define what specific uses will be made of our DSP capabilities. Quality technology, market leadership, fast time-to-market, and industrial strength solutions are the messages which flow through our promotions.

Important challenges exist in our plan with the identification of significant direct and indirect competition in all markets. A key aspect of our response is to maintain a market leadership position and to outgrow our competitors.

By the year 2000, we see Spectrum as a \$92M company. While the desktop market will see the largest annual growth, averaging 65%, our primary strength will be seen in the industrial market as it builds on already substantial revenues of \$7.8M by the end of this year. Changes in organizational structures and processes are planned for years 3 and 4 as we prepare ourselves for the new challenges of being a larger company.

Our goal is world leadership in applying DSP technology. We will accept nothing less.



Executive Summary vs. Abstract

Proposal



R/F Spec, Design Spec



Executive Summary	Abstract
Audience: Non-specialist	Audience: Specialist
Purpose: Persuade	Purpose: Inform
Plain language/1 st person	Technical language/passive
General	Specific
May use graphics	Plain text + Technical graphics



Body of the Proposal -- I

- Introduction (general info about what you are proposing, why the system/device is needed or desirable, description of the content and organization of the document, scope of the project -- don't simply parrot the executive summary!)
- Provide high-level detail about the proposed system/device (include a high-level graphic – a “cloud-shaped” graphic and/or a block diagram is useful here)
- Analysis of the need and benefits or desirability of the device/system, the potential market for it, the existing competition and other risks; this will require some research!

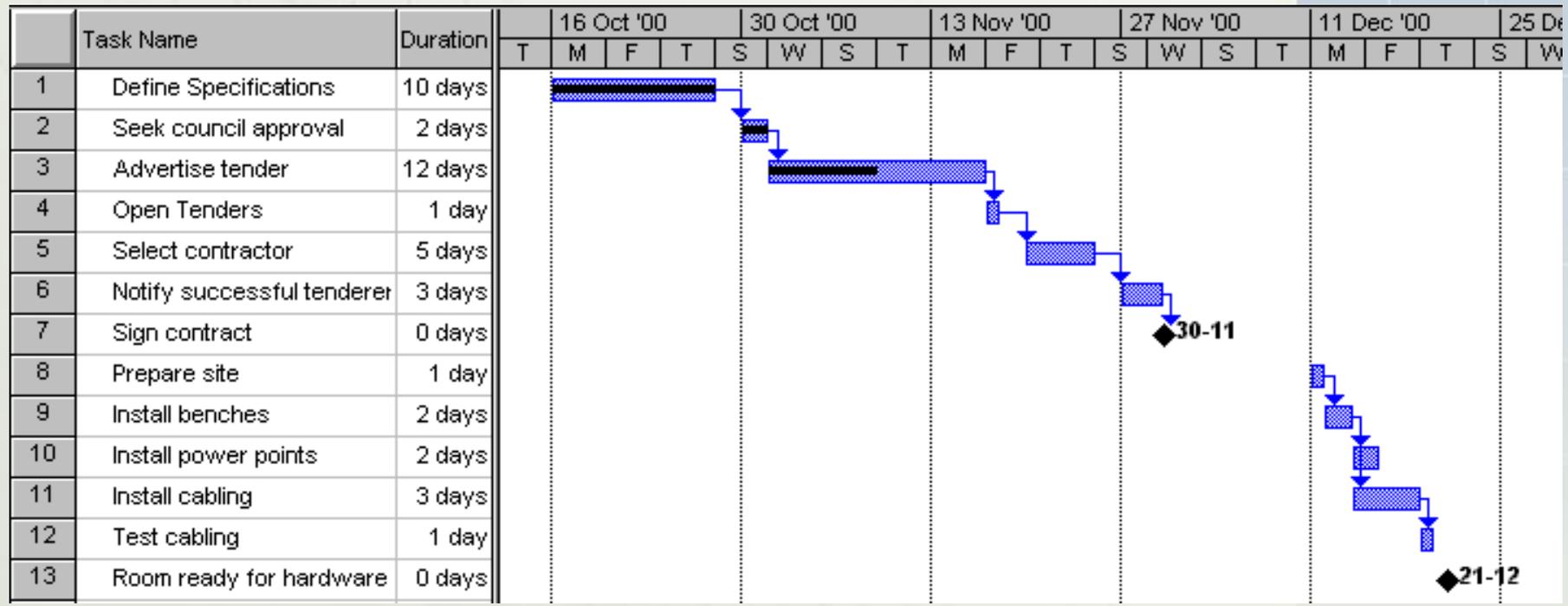


Body of the Proposal II

- Preliminary Budget (include expenses and how you propose to fund it: ESSS, Wighton funds, external funder, yourselves; include a contingency (usually about 20%))
- Time schedule (include both Gantt and Milestone charts -- or they can be combined using MS Project to produce a PERT chart). **Do not limit the milestones to the documentation or other assignments – include research, design, software, and hardware milestones**
- A one paragraph description of each team member's expertise/experience and their administrative and technical roles (alternatively you can add an appendix for resumes – not recommended)



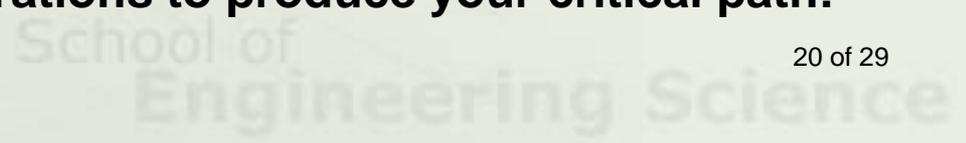
Gantt & Milestone Charts (MS Project)



Bar = Process Duration; Diamond = Milestone

PERT = Program Evaluation Review Technique

Analyse concurrent process durations to produce your critical path!





Conclusion

- Conclusion should have more than a single brief three sentence paragraph (far too short).
- Include an summary of the proposal, but also use the opportunity to persuade your audience of the need, benefits, desirability, and profitability of the project.
Repetition matters here!
- As well, ensure you make it clear that you have the expertise and ability to complete the project. Do some marketing here.



References and Appendices

- Include references for the information sources you have used to prepare the document. The length of your references speaks volumes about your credibility (ethos) as it indicates you are not simply making stuff up. Do not rely too much upon Wikipedia – it is a good place to start, but it lacks detail and credibility.
- Use IEEE format for the references.
- Appendices can also be used to provide some material backing up your arguments, outlining competition, etc.

ENSC 305W/440W Grading Rubric for Project Proposal

Criteria	Details	Marks
Introduction/Background	Introduces basic purpose of the project. Includes clear project background.	/05%
Scope/Risks/Benefits	Clearly outlines project scope. Details both potential risks involved in project and potential benefits flowing from it.	/15%
Market/Competition/Research Rationale	Describes the market for a commercial project and details the current competition. For a research project, the need for the system or device is outlined and current solutions are detailed.	/10%
Company Details	Team has devised a creative company name, product name, and a logo. Outlines relevant skills/expertise of team members.	/05%
Project Planning	Details major processes and milestones of the project. Includes Gantt, Milestone, and/or PERT charts as necessary (MS Project).	/10%
Cost Considerations	Includes a realistic estimate of project costs. Includes potential funding sources. Allows for contingencies.	/05%
Conclusion/References	Summarizes project and motivates readers. Includes references for information from other sources.	/10%
Rhetorical Issues	Document is persuasive and could convince a potential investor to consider funding the project. Clearly considers audience expertise and interests.	/10%
Presentation/Organization	Document looks like a professional proposal. Ideas follow in a logical manner. Layout and design is attractive.	/10%
Format Issues	Includes letter of transmittal, title page, executive summary, table of contents, list of figures and tables, glossary, and references. Pages are numbered, figures and tables are introduced, headings are numbered, etc. References and citations are properly formatted.	/10%
Correctness/Style	Correct spelling, grammar, and punctuation. Style is clear, concise, coherent.	/10%
CEAB Outcomes: Below Standards, Marginal, Meets, Exceeds	11.2 – Cost Considerations: 11.3 – Project Assessment and Scope: 11.4 – Project Risk: 11.5 – Project Planning:	



Example High Quality Proposals (IMHO)

Located on the ENSC 405W Website at

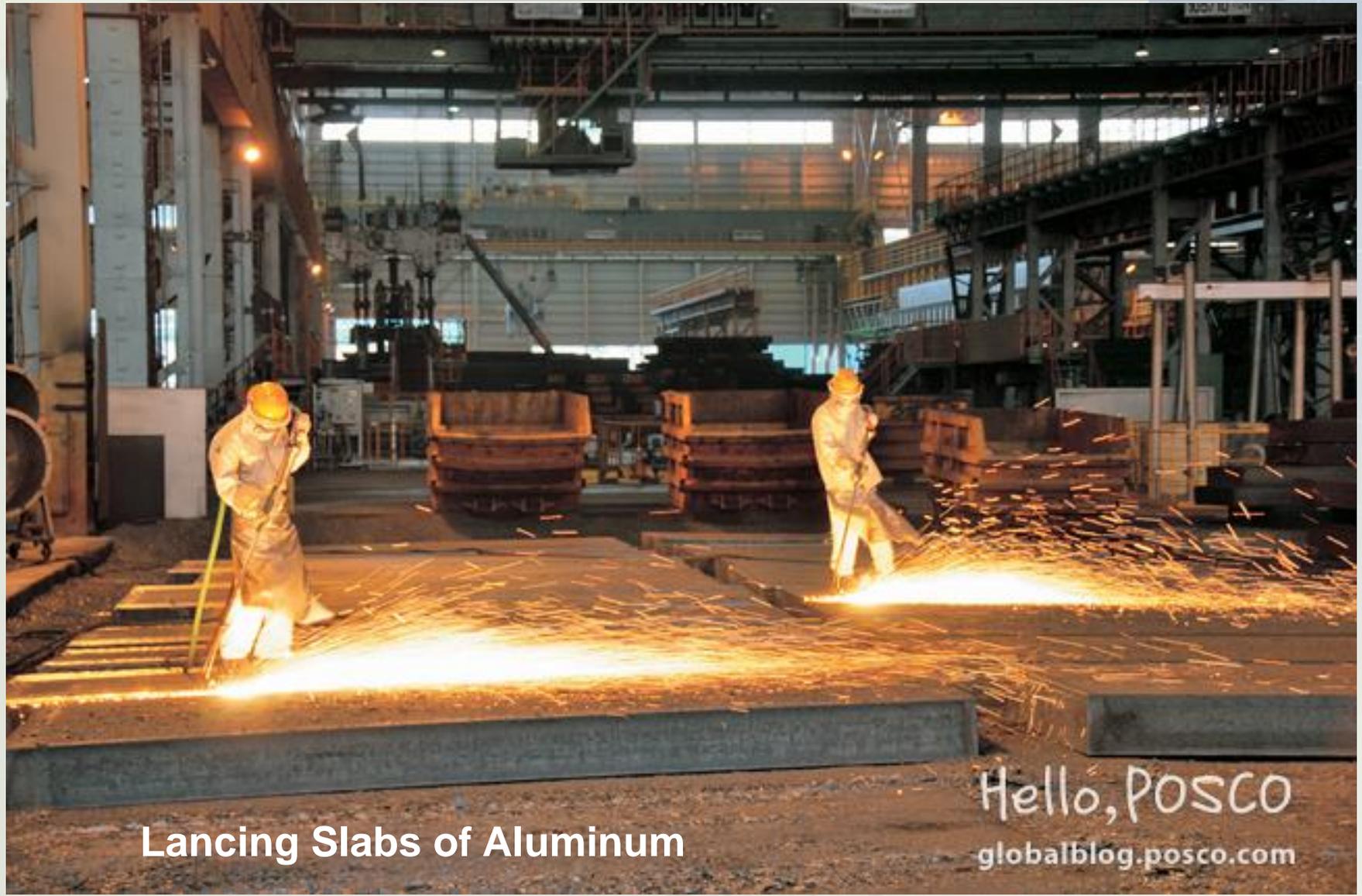
<http://www2.ensc.sfu.ca/~whitmore/courses/ensc305/project.html>

- **Research Project:** 2015-3, Team J, *MRI Solutions*.
- **Consumer Project:** 2017-1, Team 3, *LumoTech*.
- **Consumer Project:** 2017-1, Team 5, *CaneTech Solutions*.
- **Research Project:** 2018-1, Team 5, *ThinkUp*.
- **Commercial Project:** 2018-1, Team 7, *Paintbot Inc.*



Focus on the Problem – Not on the Technology

- Many Engineers love technology in and of itself
- The rest of the world doesn't care about the technology – just fix the damn problem
- Sometimes Engineers ignore the **Physics** involved
- Often Engineers ignore the **Users** involved
- Powdered metal torches, magnetic fields, and scarfers
- Aluminum Company of Canada – *Alcan* (now *Rio Tinto*) in Kitimat, BC



Lancing Slabs of Aluminum

Hello, POSCO
globalblog.posco.com



Engineers – Sigh ...

Harris *IronFerno* powdered metal cutting torch for non-ferrous metals (aluminium)



Safety Gear



Iron Powder Dispenser
(Ours also had 4, 100 lb O₂ tanks
and 1, 50 lb tank of acetylene attached)



A Tale of Two Realities: ca.1973-74

Me (mouthy 18 year old): “The iron powder is ground too coarsely.”

Engineer: “No, it’s the magnetic fields.”

Me: “It worked before. The iron powder is ground too coarsely!”

Engineer: “No, we are going to spend \$250 K to solve the problem with the magnetic fields. Use lances for the next 4 months.”

Me (*sotto voce*): “You are an idiot.”

4 months later

Me (to Chemist): “The iron powder is ground too coarsely.”

Chemist (after analysis): “Yes, the iron powder is ground too coarsely.”

2 weeks later

Senior Manager (to Engineer): “You are fired.”

Engineer: “But why?”

Senior Manager: “You are an idiot!”



Conclusion

“**Never** attribute to malice that which is adequately explained by **stupidity.**”

-- Hanlon's Razor