FUN*da*MENTALS of Design

Topic E

Ethics & Professionalism

Topic E
Engineering Ethics

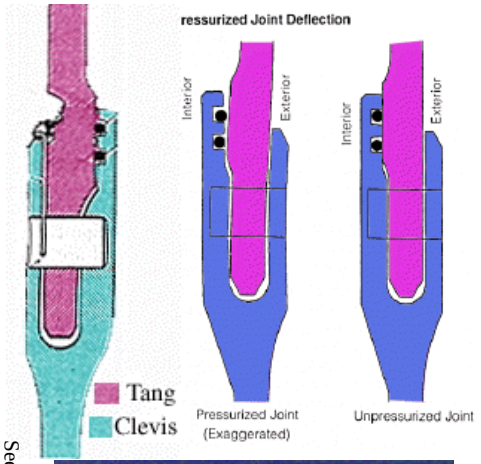
Look for happiness all around, and if you do not find it, create it!

Topics

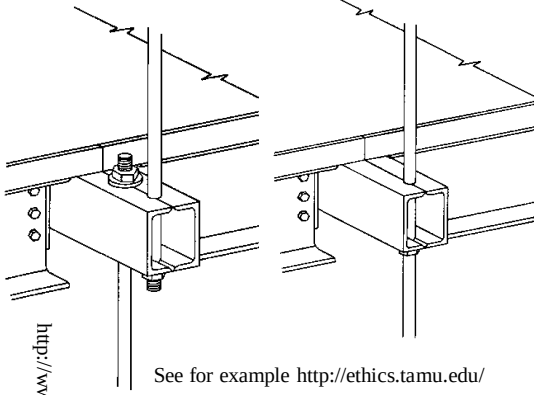
- Ethics makes good sense
- Creative people
- Teams
- Peer review
- Patents
- Professionalism

Ethics is not just about what you should do in a situation, *Ethics* is about looking ahead to prevent possible problems. Consider *Engineering Ethics* in the context of question and answer scenarios. Some suggested "correct" answers are underlined. Are they the best ones?

How Can You Help?



See for example http://history.nasa.gov/sts51.html



See for example http://ethics.tamu.edu/

http://www.sgh.com/expertise/investigations/kchyatt/kchyatt.htm

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E-mail warned of descent disaster risk

Thursday, February 13, 2003 Posted: 2:12 PM EST (1912 GMT)

JOHNSON SPACE CENTER, Texas (CNN) -- An e-mail passed between NASA engineers two days before the fatal breakup of the space shuttle Columbia discussed worst-case scenarios involving tiles on the orbiter's underbelly that may have been damaged shortly after liftoff, specifically dealing with failures during descent.

The area where something was seen falling off the shuttle.

Robert Daugherty, an engineer, outlined several scenarios in his e-mail to David Lechner, who worked with the shuttle's mechanical systems.

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http://www.cnn.com/2003/TECH/space/02/12/nasa.memo/index.html

The New York Times **National**

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Dogged Engineer's Effort to Assess Shuttle Damage

By JAMES GLANZ and JOHN SCHWARTZ
Published: September 26, 2003

HOUSTON — Over and over, a projector at one end of a long, pale-blue conference room in Building 13 of the Johnson Space Center showed a piece of whitish foam breaking away from the space shuttle Columbia's fuel tank and bursting like fireworks as it struck the left wing.

In twos and threes, engineers at the other end of the cluttered room drifted away from their meeting and watched the

Michael Stravato for The New York Times
Rodney Rocha, a NASA engineer, conveyed the urgent message that the agency should seek satellite images that could show possible damage to the Columbia's wing.

http://www.cbsnews.com/stories/2003/07/10/tech/main562542.shtml

Creative People

- Truly creative people should not be hampered by schedules:
  - True
  - False
- Truly creative people should not be concerned with budgets:
  - True
  - False
- Truly creative people can be very difficult to manage because they do not want to be hampered by budgets and schedules:
  - True
  - False
- Truly creative people who manage budgets and schedules are far more effective and loved and respected than those who do not:
  - True
  - False

Teams

- A cohesive motivated team can easily make up for technical deficiencies amongst its members:
  - True
  - False
- A strong team should ideally have individuals who are competent in all of the disciplines required to complete the project, or they should be authorized to acquire such members or appropriate consultants:
  - True
  - False
- If a member of your team is not pulling their own weight, the best thing to do is:
  - Ignore it, because if you complain, you will be labeled a whiner
  - Ignore it, because their failure will be noticed by the team leader who is responsible
  - Discuss the issue with others on the team who are working hard to see if they concur, and then as a group go talk to the team leader
  - Try to talk to the person and see if there is anything you can do to help

Teams: *Management*

- Managers should consider the cost of offsite development programs led by experienced creativity consultants as an essential part of new product development:
  - True
  - False
  - Bridges in Brooklyn are often available for low cost
- Managers should consider first asking a team what they feel would truly enhance their creativity, and then work with the team to establish a project schedule and budget on which all team members sign off:
  - True
  - False
- Mangers should consider the personal lives of employees when forming a team:
  - Its best to try and put singles on a team so they will form relationships and get married and then become more stable company employees
  - Its best to put people on a team who have been married for a long time because they will be more likely to stay late and work harder
  - Its best to mix single and married people so they will want to mingle after work and thus may be inclined to get more work done
  - Social engineering does not work and managers should build teams based on abilities

Peer Review

- It is vital that you learn to give and take constructive criticism because:
  - Your competitors are never shy
  - You want to become a better person and designer, as well as help others become better persons and designers
  - You are likely to never advance if you are a twit
- A colleague makes a practice presentation to the group the night before the presentation before a review panel, and you notice some fundamental, but fine-point conceptual issues with some of the slides, so you:
  - Ignore the issue because only a geek like you would ever notice
  - Ignore the issue because only a geek like you would ever notice, and if they were not smart enough to get it right, it serves them right!
  - Raise the issue, in a nice way such as by saying "only a geek like me would notice but I see a problem with the conniption pin angle"
  - Raise the issue, in a nice way such as by saying "only a geek like me would notice but I see a problem with the conniption pin angle, perhaps it could be inverted, and if you like, I would be happy to work with you to do whatever modifications are needed in order to be ready for tomorrow"
  - Wait to send them a private email later
  - Privately tell your supervisor

Peer Review

- *PREP* stands for:
  - Precision Repeatable Engineering Process
  - Peer Review Evaluation Process
  - Ponder, Read, Evaluate, Proceed
- Peer review of others' written ideas before a brainstorming meeting enables the team to:
  - Make sure each individual has a chance to think about the problem on their own
  - Make sure each team member has had private time to think about the ideas of others
  - Keep a good record of who thought of what

Peer Review

- Whenever you are reviewing the work of others:
  - Just point out what is wrong, as it is their responsibility to fix the problem
  - Try to not be too critical
  - Point out every error and point-that-needs-clarification you find, AND make suggestions as to how to resolve the issues
- At a review presentation you are giving, a colleague viciously lashes out that you made a mistake:
  - You counter attack with equal or more viciousness to teach them a lesson
  - You graciously disarm them and then if they actually have a good point you acknowledge the error and seek to fix it "Parting the deep waters I see that you have a good point that I will work on to resolve"; and if they are not correct you say "I do not see your point…" and then if time allows resolve it then and there.
  - You start an argument with them about why what they said does not apply (regardless of whether or not it does) to save face
  - You make a note to next time make sure only decaf coffee and sugar-free donuts are served

Personal Relations: *Harassment*

- If a coworker makes unwanted overtures toward you, best first options include:
  - File a lawsuit
  - Tell them "no thank you"
  - Tell your supervisor
  - Ask a mutual friend to please discretely alert them to the fact you have other personal commitments, and office relationships are not a good thing, and if this does not work, then tell your supervisor
- If you observe inappropriate harassment-type behavior, you should:
  - Tell your supervisor
  - Tell the person to stop
  - Mind your own business
  - Ask the person being harassed if they want you to help

Personal Relations: *Good Intentions*

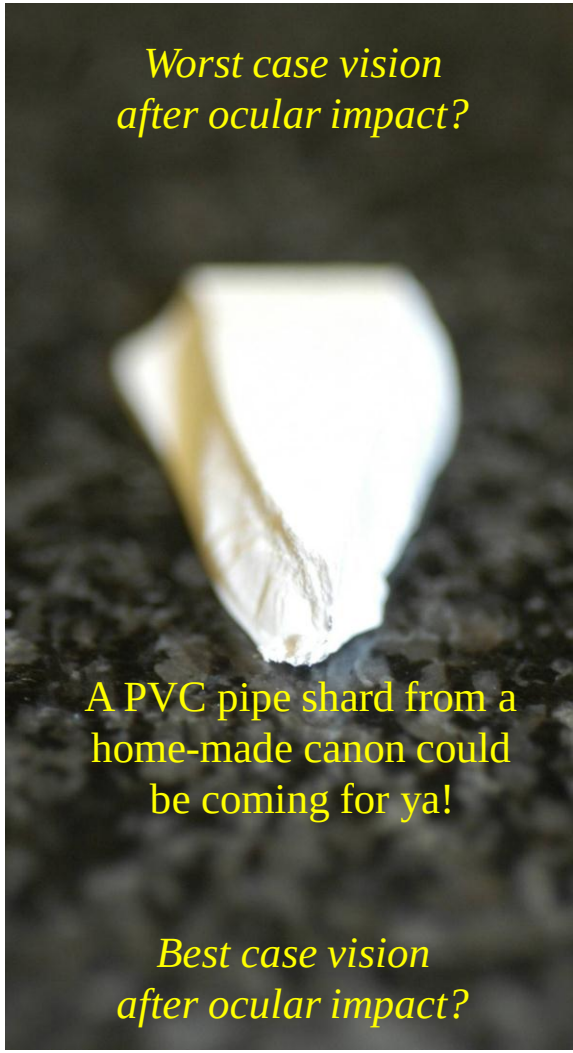
- If you have uncontrollable desire to get better acquainted with a coworker, you should:
  - Forget it and start taking more cold showers
  - Ask a mutual friend to see if such interest might be welcomed
  - It's nobody's business but yours, so go for it!
- If you are to become involved with someone in your company, its best to:
  - Only ask out your subordinates so you can then make them do more work and thus also win company productivity awards
  - Only ask out superiors so you can get them to give you company awards
  - Only ask out those of equal rank
  - Only ask out those with whom you will not have a conflict of interest, and then make sure your supervisors are aware of the relationship
  - Advertise the fact that you are dating so other people will stay away
- If your advances (to someone with whom you will not have a conflict of interest) are welcomed, you should
  - Tell your boss about the relationship so as to avoid potential conflict of interest issues
  - Be discrete and keep your relationship outside the company

Safety

- Design things as if YOU had to use them everyday yourself:
  - True
  - False
- Safety features are not related to machine performance and therefore can be put off until the technological heart of the machine has been developed:
  - True
  - False
- Unless a machine is designed so people feel safe using it, it will probably not be successful:
  - True
  - False
- Safety standards can play a critical role in defining work envelopes and thus may also have a critical impact on the machine's technological detail:
  - True
  - False

Safety

- You see folks playing with a "canon" made from PVC pipe for shooting tennis balls… and you KNOW from this book that PVC is a brittle material and should never ever be used for pressurized gas systems (see page 7-26), so you:
  - Tell the kids how PVC shatters and sends shards flying that can blind and maim
  - Darwin rules, so you walk away and ignore them
- They start to argue that they got the design off the internet!
  - Explain to them how you can find anything you want to on the internet, including facts such as the Earth is flat, and our ancestral space alien fathers will be here tomorrow to make everything OK!
  - Darwin rules, so you walk away and ignore them
- They start to argue that they are using schedule 80 pipe which is real strong!
  - Explain to them that just a scratch can be a stress concentrator, and the thick pipe makes for even higher velocity shards when the higher pressures make it blow!
  - Darwin rules, so you walk away and ignore them



Safety

- You see a design that violates common safety practices:
  - Go as high as you need to up the responsibility chain to alert someone who can take action to fix the problem
  - Its not your problem, you have your own deadlines to worry aout
- Passive safety methods (warning labels) are often good enough for many types of products:
  - True
  - False
- Active safety methods (guards and lock-outs) are rarely needed:
  - True
  - False

Safety

- You are in an arcade and see a reciprocating choo-choo ride for kiddies that oscillates back and forth, but on the back-stroke it comes within a few inches from the wall. You tell the manager, but he does nothing about it, so you:
  - Try to contact someone higher up
  - Unplug the machine and tie the cord in a knot
  - Do nothing, its not your business
- The manager calls the police and a tough cop comes and starts to aggressively question you and threaten to arrest you for damaging personal property:
  - You thank the officer for his rapid attention, quickly explain that a child could be crushed, and ask him to arrest the manager for violating a plethora of federal safety codes and for endangering children
  - Become meek and mild and make up excuses and try to get away
  - Tell him to go finish his donut and mind his own business

Email

- Emails and memos:
  - Can and will be used against you
  - Never really go away
  - Are a good means to document a design to later establish invention priority
- After you write that critical abusive email:
  - Hit "send" write away so you will not be tempted to wimp out
  - Send it to yourself ONLY and pretend you are the recipient so you can read it later and see how you would feel if you received such an email.

Whistle Blowing

- The right ways to "blow the whistle" include:
  - Speak with your supervisor
  - Send anonymous memos to appropriate people with the power to resolve the issue
  - Anonymously tip off the press and let them do the dirty work
  - Hold a press conference
- If you become aware of a potentially harmful event (e.g., the Challenger space shuttle O-ring disaster), you should:
  - Try to work within established company procedures for handling such events, and be satisfied you did your best
  - Try to work within established company procedures for handling such events, and keep your eye on the clock, and have a contingency plan for using the press or whatever it takes as a last resort to prevent the harm
  - Ignore it and feign ignorance because its none of your business, and you do not know them enough to get involved
  - Blame your superiors so they get fired and you move up the ladder!

Patents

- If a patent is found that relates to a machine being developed, the engineer should:
  - Check the expiration date on the patent
  - Check to see if the patent has been abandoned
  - Check to see if the assignee is a competitor
  - Alert the product manager as the possible interference and work with the team to develop alternate designs
- When a manager is faced with a patent that may have claim to a project for which they are responsible:
  - Ask the legal department for advice
  - Ignore the patent and later feign ignorance
  - Develop countermeasures to handle the risk
- A good strategy is to file as many patents related to an area as possible so you can build a protective fence around yourself, or to contain a competitor:
  - True
  - False
- Filing many patents around an idea is referred to as “picket fencing”
  - True
  - False

Patents

- Companies that find that a non-competitor's patent claims cover some aspect of one of their products should:
  - Hire a crack team of lawyers because whoever spends more is likely to prevail in court
  - Investigate the potential for an amicable license and then use first-to-market and the precedent for validity of the patent as a market advantage
  - Ignore the patent, and then delay while trying to design around the patent claims
- Companies that find that a competitor's patent claims cover some aspect of one of their products should:
  - Hire a crack team of lawyers to first try to invalidate and/or prove non-infringement because whoever spends more is likely to prevail in court
  - Evaluate market potential and investigate the potential for an amicable license by making note of the fact that very few companies will want to by from a sole-source supplier
  - Use the patent as a catalyst to design a better (and paten table in its own right) alternative
  - Ignore the patent, and then delay while trying to design around the patent claims
- Your boss says "we need to add Joe to the patent because it will make him feel like he is part of the team", but Joe had nothing to do with the invention, so you:
  - Say "OK" to keep the boss happy
  - Say "that's a great idea, because in fact the patent office requires each inventor to be associated with specific claims else the patent can be invalidated, so lets go through the patent and make sure we did not miss any other team members"
  - Say "WHAT, ARE YOU CRAZY, JOE IS AS USELESS AS A RUBBER SWAB HANDLE"

Professionalism

- The goal of a competitive business should be to:
  - Bury the competition by whatever means it takes
  - Focus effort and resources on creating and servicing a better product
  - Competition is best for the long term growth of the economy as a whole, so embrace it
- You receive a competitor's business plan in an unmarked envelope, and you:
  - Secretly read it and act to counter it
  - Do not read it, but instead send it to your competitor's CEO with a letter saying someone sent it to you, but you did not read it, and you hope that your two companies can be friendly competitors, and that you both must tell employees such practices (giving or receiving of confidential information) will NOT be tolerated.
  - Read it and act on it as if nothing is unusual because it is not your fault if your competitor has leaks
- Valuable "gifts" from vendors (and giving them) are important "business catalysts" to give and receive:
  - True
  - False

Reverse Engineering

- Reverse engineering (taking apart a competitor's product) is unethical
  - True
  - False
- Really smart engineers do not have to take apart their competitor's machines tro know that are better:
  - True
  - False
- Using the results of reverse engineering can get you in trouble if you learn from a competitor's design and copy, but you do not realize they have a patent.
  - True
  - False
- Open-source software that excludes commercial application can be ignored because no one will ever see it deep in the machine's source code:
  - One day it will be found, perhaps in a patent lawsuit, and you have wish you had read this section more caefully
  - False: who cares?

Professionalism

- A reporter asks you what you think of someone else's product or program, which you actually do not feel very good about, and you:
  - Take the opportunity to honestly, in your opinion, describe its shortfalls
  - Say “no comment", and thereby imply you hate it
  - Say to yourself “if you cannot say something nice about something, then say nothing at all” and instead reply “I am happy to tell you about the attributes of my stuff, and then let your audience compare and draw their own conclusions”
- All too often, someone says something to a reporter, and then they feel that their view is misrepresented and then misunderstood
  - True
  - Build a door for your mouth and bolt it

Professionalism

- You read an article or an editorial that you feel is highly critical of you, and reasonable options are
  - Write a counter editorial or article that takes the other view apart piece-by-piece
  - Write a "I beg to disagree" letter pointing out primary specific facts that are a matter of public record, and then invite the person to publicly debate the rest if they have faith in the accuracy of their allegations
  - Contact an ombudsperson to mediate
  - If all else fails, and you are not a public figure, see a lawyer about a libel suit
- You are told by a friend that they said they heard that she said he said you are a flaming twit, and possible options to consider include:
  - You aggressively counterattack
  - You confront the supposed insulter
  - You tell your friend to pass it back up the line that you suggest a meeting to iron out differences
  - You confront the supposed name-caller
  - You try calm personal contact with the supposed name caller to try and find out if you share common interests…, and if that fails, you ask an ombudsperson to help mediate
  - You ignore the entire conversation
  - You do a careful self-evaluation to try and determine why someone may have this view of you, and think about evolving

Professionalism

- You carefully deterministically design a module according to schedule, but management gives praise to those who finish fast and sloppy (and then start iterating) and then complains you not fast enough (even though you are on schedule), so you:
  - Nicely point out that you are on schedule, and that you do not expect to have to iterate and that your design will be fully documented
  - Suggest that the project should keep track of the long term success rate of iterative verses deterministic design approaches (including performance of the product after it has been shipped)
  - Send an email to your boss, and copy his boss, telling them why they have no clue how to manage a project
  - Start an informal lunchtime seminar for employees to share design experience so as to learn from experience and help build institutional memory
- Your company outsourced a design, you were not allowed to have any input, and now it does not work and management tells you its your job to make the design work:
  - Refuse to work on the project
  - You tell your boss "I told you so" as you hand in your resignation because you have found a better job
  - Write up and send your boss a "Harvard Business Review" type case study where you show the outsource design, the problems it has, the fixes you identified, and the savings in time that would have been realized if it had been designed in-house with the advantage of all the company's expertise
  - Start an informal lunchtime seminar for employees to share such stories not to gripe, but to learn from experience and help build institutional memory