

The following is the two-hour long, interactive engineering ethics and professionalism seminar presented to Columbia University materials science and engineering masters students on April 8, 2016.

The first several slides describe recent and classic events in ethics (confined here engineering ethics and professionalism) and are updated every year.

The next set of slides is core material that is used every year.

Most of the remaining period is used in presenting classic cases and discussing them.

This seminar and the author's other seminars on ethics are available at the author's web site, <http://www.columbia.edu/~iph1/teaching.html> . This site also includes a set of mini-case synopses that describe a range of research ethics and professional situations. This site is continually updated.

You are free to use these slides in a seminar presentation, but you may not distribute them in any manner either as is or in any modified form.

Feedback concerning these slides can be directed to me at IPH1@columbia.edu .

- Irving P. Herman, Department of Applied Physics and Applied Mathematics, Columbia University; posted 4-12-16.

Engineering, Industrial, Societal, and Professional Ethics

For All of Us

APAM/MSE/Photonics IGERT Seminar
Friday, April 8, 2016

Honda Drops Takata as U.S. Issues Huge Fine Over Airbags

Nov. 4, 2015 By HIROKO TABUCHI and DANIELLE IVORY
Online version downloaded 11/5//15 and used below <http://www.nytimes.com/2015/11/04/business/us-regulators-fine-takata-up-to-200-million-over-faulty-airbags.html>

- Honda Motor Company on Tuesday dropped the embattled manufacturer Takata as its airbag supplier, concluding that the company, **its longtime partner, had “misrepresented and manipulated test data.”**
- Anthony Foxx, the transportation secretary, also said that Takata manipulated the test data. In its consent order, the safety agency said that **“in several instances, Takata produced testing reports that contained selective, incomplete, or inaccurate data.”**
- In a news conference in Tokyo on Wednesday, Hiroshi Shimizu, Takata’s senior vice president for global quality assurance, **denied that company engineers had manipulated test data.** “There was no problem with our test results. *But because there was variation in the data, we did not report everything. We reported only part of the data,*” Mr. Shimizu said. Still, he said, **“there was no data manipulation.”**

This is called cherrypicking.

Takata Emails Show Brash Exchanges About Data Tampering

By DANIELLE IVORY and HIROKO TABUCHI
JAN. 4, 2016

Online version downloaded 2/12/2016 and used below <http://www.nytimes.com/2016/01/05/business/takata-emails-show-brash-exchanges-about-data-tampering.html?smprod=nytcore-iphone&smid=nytcore-iphone-share>

- “When Honda Motor Company said two months ago that it would no longer use Takata as supplier of its airbags, the automaker said that testing data on the airbags had been **“misrepresented and manipulated.”**”
- “Now, newly obtained internal emails suggest **the manipulation was both bold and broad**, involving open exchanges among Takata employees in Japan and the United States.”
- **““Happy Manipulating!!!”** a Takata airbag engineer, Bob Schubert, wrote in one email dated July 6, 2006, in a reference to results of airbag tests. In another, **he wrote of changing the colors or lines in a graphic “to divert attention” from the test results and “to try to dress it up.”**”

This is even more blatant deception.

Document Claims Drug Makers Deceived a Top Medical Journal

By Kati Thomas, New York Times, Wednesday, March 2, 2016 pages B1, B8

- Did Duke University researchers leave out critical lab data on testing the safety of the (Johnson & Johnson, Bayer) blood-clotting drug Xarelto from their New England Journal of Medicine (NEJM) paper, and deceive editors there?
- The patients may have been given the the wrong doses from a faulty machine in the Duke Clinical Research Institute testing lab.
- In NEJM Duke claimed that this did not affect the trial results
- Duke took some more data using a central laboratory, but did not report the results in NEJM
- A manuscript reviewer asked **whether additional data were available**
- Duke **answered no** to this query, as posed to them, after rephrasing by the NEJM editor: **whether additional data were available throughout the course of the trial**

Poison Gas Leaks from a Union Carbide Pesticide Factory in Bhopal, India – December, 1984

- Often described as the worst industrial accident in history.
- The pesticide methyl isocyanate, or MIC, was released when water leaked into one of the storage tanks late on the night of Dec. 2, setting off the disaster. The main warning siren went off two hours after the leak began.
- Immediate death toll: 3,800 (by Union Carbide); 15,000 (by municipal workers). (Hundreds died in the stampede that followed the leak.) Thousands have died since, and an estimated 50,000 people became invalids or developed chronic respiratory conditions as a result of poisoning.
- Safeguards known to be substandard were ignored rather than fixed:
 - Staffing at the plant had been cut to save money.
 - Workers complaining about codified safety violations were reprimanded & at times fired.
 - No plan existed for coping with a disaster of this magnitude.
 - Tank leak alarms that would have alerted personnel hadn't functioned for at least 4 years.
 - Other backup systems were either not functioning or nonexistent.
 - Single backup system, unlike the four-stage system typically found in U.S. plants.
 - Tank held 42 tons of MIC, well above the prescribed capacity; 27 tons likely escaped.
 - Water sprays designed to dilute escaping gas were poorly installed & proved ineffective.
 - Damage known to exist to piping and valves had not been repaired or replaced, because the cost was considered too high. Warnings from U.S. and Indian experts about other shortcomings at the plant were similarly ignored.

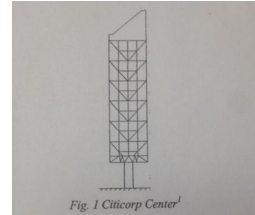
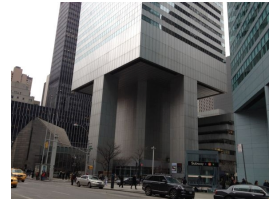
The Aberdeen Three, 1989



- Aberdeen Proving Ground – U.S. Army facility that develops, tests, stores, and disposes of chemical weapons.
- 1976, Congress passed the Resource Conservation and Recovery Act (RCPA) – regulated management of hazardous waste, including criminal fines for violations.
- Periodic inspection from 1983-1986 revealed serious problems at the “Pilot Plant” – toxic chemicals misplaced, unlabeled, poorly contained.
- External sulfuric acid tank leaked 200 gallons into a nearby river.
- Investigators came and found the chemical retaining dikes were unfit and containment was corroded and leaking chemical into the ground.
- Three civilian engineer managers (Gepp, Dee and Lentz) maintained:
 - The plant’s storage practices were legal
 - Their job description didn’t include responsibility for environmental rules
 - They were just chemical engineers practicing “good engineering sense”
 - They were just following usual procedures at the Pilot Plant.
- They were indicted for criminal felony on June 28, 1988 and convicted – sentenced to 3 yr probation +1000 h community service (max 15 yrs+750K)
- The prosecutor: “These are experts in their field. If they can’t be expected to enforce the law, then I’m not sure who can”.

Citicorp Building – Design Flaw Found In Time After Construction

- **Unusual situation:** Built in 1977: 59 floors, with the lowest nine floors being stilts---to accommodate St. Peter's Lutheran Church, which occupied one corner of the building site at 53rd St. & Lexington Ave.
- **Unusual design needed:** The stilts needed to be in the middle (not the corners), so chief structural engineer, William LeMessurier used a (light) chevron bracing structure for stability---and added a tuned mass damper to keep it stable in the wind.
- **Design error found:** In 1978 LeMessurier confirmed the claim of a (for some-time unknown) undergraduate architecture student that the building was particularly vulnerable to quartering winds (winds that strike the building at its corners). **Normally, buildings are strongest at their corners, and it's the perpendicular winds (winds that strike the building at its faces) that cause the greatest strain for a normal building.** LeMessurier had accounted for the perpendicular winds, but not the **quartering winds**. He deduced that a storm strong enough to topple Citicorp Center hits NYC every 55 years if the damper worked and every 16 years if damper did not work due to loss of power during the storm.
- **Mistake rectification:** The building was fixed in secret, as Hurricane Elba threatened to hit NYC. Later, after seeing a BBC on the Citicorp Center crisis, Diane Hartley, realized it was her undergraduate thesis that had averted a disaster.



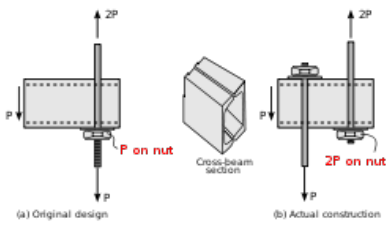
Hyatt Regency Hotel Walkway Collapse, Kansas City, July 17, 1981

– Design Flaw Not Found In Time After Construction

- The multistory atrium was spanned by elevated walkways suspended from the ceiling, connecting the second, third and fourth floors between the north and south wings.
- While all were watching dance competition, the fourth floor walkway (with 16-20 people) collapsed on the below second floor walkway (with ~40 people), which then fell to the atrium floor lobby.
- The hotel's sprinkler system had been severed by falling debris, flooding the lobby and putting trapped survivors at great risk of drowning during rescue operations.
- **114 died and 216 were injured**
- Construction difficulties had resulted in a flawed design change that doubled the load on the connection between the fourth floor walkway support beams and the tie rods carrying the weight of both walkways. This new design was barely adequate to support the dead load weight of the structure, much less the weight of people.
 - **It supported only 60% of the minimum load required by K.C. building codes.**
- **How did it happen?** Havens Steel Company, the contractor responsible for manufacturing the rods, objected to the original plan of Jack D. Gillum and Associates. There were serious flaws of the revised design and poor communication between them. Gillum failed to review the initial design thoroughly, and accepted Havens' proposed plan without performing basic calculations that would have revealed its serious intrinsic flaws — in particular, the doubling of the load on the fourth-floor beams, and Gillum's preliminary sketches were interpreted by Havens as finalized drawings.
- **At the time, it was the deadliest structural collapse in U.S. history (and was so until the collapse of the south tower of the World Trade Center in 2001).**



Locations of the second and fourth story walkways which collapsed; The third story walkway was offset by several m.



Range of Discussion

Data and Research

Authorship

Papers and Theses - Content

Preparing Proposals

Reviewing Papers and Proposals

Employment and Conflicts of Interest

Other - medical, society, industrial ethics

**Responsible
Conduct of
Research**

**Professional
Ethics**



Ethics Awareness and Education

Ethics education is becoming a standard component in graduate and undergraduate studies

- a very good idea
- devote classes to it
or at least multi-day workshops
- equally important for experimentalists
and theorist/modelers
- now being mandated by NSF

Our start:

This seminar

On-line course (new)

Two hours today is not enough time to devote to this,
but it is a start

Raising the Issues and Defining Them

When is an issue an ethical one?

When is it just a mistake or misunderstanding or a legitimate difference in opinion?

When is it sloppiness, which is itself unprofessional if it is deemed to be “reckless”, or an honest mistake made by a careful person?

When is an issue minor or trivial and when is it major and significant-and worth following up on?

When is something a fraud or hoax, and when is the issue really difficult scientific reproducibility?

Is there just right and wrong, or is there a threshold for unethical or irresponsible behavior?

When is it just a matter of style or local convention?

Sometimes the best response is a question asking for more details about the situation - and talking to others.

Underlying “Reasons” for Unethical Actions

- Good old-fashioned greed
- Rewards could outweigh the risks
 - especially if not caught
 - not wrong if not caught
 - my family comes first
- Easier and faster to cut corners (skip work, copy, plagiarize, cheat)
- Easier to ask for forgiveness than permission
- All’s fair in love, war, and my work
 - want to get ahead at all costs
- Special circumstances for a given case
 - more important than ethics in this case
- Organizational pressures
- Ignorance of the ethical, moral or legal standards

Maybe before, but NOT after this seminar!

The Normative Ethics (The Study of Ethical Action)

Contentment and serenity (Stoicism)

Maximum pleasure and minimum pain (Hedonism)

Prudently-attained pleasure is virtue (Epicureanism)

Consequences of the action, with ends justifying means (Consequentialism)

Greatest happiness to the greatest number (Bentham, Mills; Utilitarianism)

Follow the acts (rules, duties), not consequences; Do unto others as they would have done unto you (Kant; Deontology)

Follow social consequences (not consequences, duty) (Pragmatic Ethics)

Impact on community and family (Role Ethics)

Equal liberties, fairness, opportunities for all (Social Justice; John Rawls)

Lawrence Kohlberg's Stages of the Moral Development of (Many) People

Judge morality of an action by its direct consequences (Children and some adults)

1. Obedience and Punishment: *How can I avoid punishment?*
2. Self-interest: *What's in it for me?*

Judge morality by comparing them to society's views and expectations (Adolescents and some adults)

3. Interpersonal accord and conformity: *Social norms, Be a good boy/girl attitude to live up to expectations*
4. Authority and social-order maintenance: *Law and order morality*

An individual's own moral perspective may take precedence over society's view (Many, but not all adults)

5. Laws are social contract and not edicts: *Need to be changed when they do not meet general welfare, by majority decision and compromise*
6. Universal ethical principles: *Principled conscience, laws must be grounded in justice, must view interactions with others as "in their shoes"*

Normative Ethics and the Highest Levels in the Kohlber Development

are used in

Applied Ethics

(What a Person Must Do in a Given Situation)

which is our main focus here

Professional Ethics – IEEE Code of Ethics

We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

1. **to accept responsibility** in making decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
2. **to avoid real or perceived conflicts of interest** whenever possible, and to disclose them to affected parties when they do exist;
3. **to be honest and realistic in stating claims** or estimates based on available data;
4. **to reject bribery** in all its forms;
5. **to improve the understanding of technology**; its appropriate application, **and potential consequences**;
6. to maintain and improve our technical competence and to undertake technological tasks for others **only if qualified by training or experience**, or after **full disclosure of pertinent limitations**;
7. to seek, accept, and offer honest criticism of technical work, to acknowledge and **correct errors**, and to **credit properly** the contributions of others;
8. **to treat fairly all persons** and to not engage in acts of discrimination based on race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression;
9. **to avoid injuring others**, their property, reputation, or employment by false or malicious action;
10. **to assist colleagues** and co-workers **in their professional development** and to support them in following this code of ethics.

ASME Code of Ethics of Engineers

The Fundamental Principles

Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

- I. using their knowledge and skill for the enhancement of human welfare;
- II. being honest and impartial, and serving with fidelity their clients (including their employers) and the public; and
- III. striving to increase the competence and prestige of the engineering profession.

ASME Code of Ethics of Engineers

The Fundamental Canons

1. Engineers shall hold paramount the **safety, health and welfare of the public** in the performance of their professional duties.
2. Engineers shall perform services only in the **areas of their competence**; they shall build their professional reputation on the merit of their services and **shall not compete unfairly with others**.
3. Engineers shall **continue their professional development** throughout their careers and shall **provide opportunities for the professional and ethical development of those engineers under their supervision**.
4. Engineers shall act in professional matters for each employer or client **as faithful agents** or trustees, and **shall avoid conflicts** of interest or the appearance of conflicts of interest.
5. Engineers **shall respect the proprietary information and intellectual property rights of others**, including charitable organizations and professional societies in the engineering field.
6. Engineers **shall associate only with reputable persons or organizations**.
7. Engineers **shall issue public statements only in an objective and truthful manner** and shall avoid any conduct which brings discredit upon the profession.
8. Engineers **shall consider environmental impact** and sustainable development in the performance of their professional duties.
9. Engineers **shall not seek ethical sanction against another engineer unless there is good reason** to do so under the relevant codes, policies and procedures governing that engineer's ethical conduct.
10. Engineers who are members of the Society shall endeavor to abide by the Constitution, By-Laws and Policies of the Society, and **they shall disclose knowledge of any matter involving another member's alleged violation of this Code of Ethics** or the Society's Conflicts of Interest Policy in a prompt, complete and truthful manner to the chair of the Ethics Committee.



I. Fundamental Canons - Engineers, in the fulfillment of their professional duties, shall:

1. Hold paramount the **safety**, health, and welfare of the public.
2. Perform services only in areas of their **competence**.
3. Issue public statements only in an **objective and truthful** manner.
4. Act for each employer or client as **faithful agents** or trustees.
5. **Avoid deceptive** acts.
6. Conduct themselves **honorably, responsibly, ethically, and lawfully** so as to enhance the honor, reputation, and usefulness of the profession.

II. Rules of Practice (selected ones)

1. Engineers shall hold paramount the safety, health, and welfare of the public.
 - a. If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate.**
 - c. Engineers shall not reveal facts, data, or information without the prior consent of the client or employer except as authorized or required by law or this Code.**
 - e. Engineers shall not aid or abet the unlawful practice of engineering by a person or firm.**

etc.

Consulting Firms

ASME Code of Ethics of Engineers

The Fundamental Canons

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American Society of Mechanical Engineers (ASME) vs. Hydrolevel Corporation, 1982

- **Conflict of interest:** An engineer used his ASME influence to get a code interpretation favorable for him.
- In 1971, the engineering firm of McDonnell and Miller requested and received an interpretation of the ASME Boiler and Press Vessel code from volunteer chairman of the ASME committee, and used this (initially without ASME's knowledge) to show that the boiler control device of competitor Hydrolevel was not in compliance with the ASME code.
- Hydrolevel later went bankrupt in part due to this, and then sued.
 - The Hartford Steam Boiler Co. settled with Hydrolevel.
 - ASME did not. The U.S. Supreme Court ruled against ASME, for \$7.5 M ruling that it was liable (through the Sherman Antitrust Law) even though the ASME leadership (1) was unaware of the action the volunteer chairman took, (2) had not approved the action, and (3) did not benefit from the action.

Trust and Reliability

- Dishonesty includes lying, deliberate deception, withholding information, failure to seek the truth.
- In research, honesty means no plagiarism and no falsification and fabrication of data.
- Professional confidentiality must be respected.
- Expert testimony must be well prepared, expert, and truthful.
- Conflicts of interest are bad because they can compromise professional judgment.

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Walmart Vice President Forced Out for Lying About Degree

http://www.nytimes.com/2014/09/17/business/17tovar.html?module=Search&mabReward=relbias%3Ar%2C%7B%221%22%3A%22RI%3A8%22%7D&_r=0

By RACHEL ABRAMS SEPT. 16, 2014 New York Times



David Tovar;
By Earl Wilson/The
New York Times

- David Tovar, the **vice president for corporate communications at Walmart**, was **forced to resign** after the retailer discovered that **he had lied** about receiving an art degree from the University of Delaware.

- “It’s my mistake. I own it,” Mr. Tovar ... “I definitely didn’t disclose that I didn’t have a degree, and there were times where it was probably an error of omission.” Mr. Tovar said he had thought he had the necessary credits to graduate from the University of Delaware with an art degree in 1996 but discovered months after participating in the graduation ceremony that he was “a couple of credit hours short.” ... He said in the interview that he did not remember what his résumé stated.

-On Tuesday, Mr. Tovar said that **Walmart had planned to promote him to a senior vice president position and discovered his education history during a routine background check** that was more rigorous than the one conducted when he was hired. “**I suppose the irony here is that I was about to be promoted and now a couple weeks later I’m going to be leaving the company,**”...

- Mr. Tovar is **not the first high-level executive to be accused of misrepresenting his education history**. In 2012, **Yahoo’s chief executive, Scott Thompson, resigned under pressure after it was revealed that he had lied about receiving a computer science degree.**

U.S. Senator Accused of Plagiarism

Senator's Thesis Turns Out to Be Remix of Others' Works, Uncited

John Walsh, Democrat, Confronts Questions of Plagiarism

<http://www.nytimes.com/2014/07/24/us/politics/montana-senator-john-walsh-plagiarized-thesis.html>

By JONATHAN MARTIN JULY 23, 2014 New York TimesOn



John Walsh,
Credit: Matt Volz/
Associated Press

- On the campaign trail this year, Mr. Walsh, 53, has made his military service a main selling point. ...

- But one of the highest-profile credentials of Mr. Walsh's 33-year military career appears to have been improperly attained. **An examination of the final paper required for Mr. Walsh's master's degree from the United States Army War College indicates the senator appropriated at least a quarter of his thesis on American Middle East policy from other authors' works, with no attribution.**

- About a third of his paper consists of material either identical to or extremely similar to passages in other sources, such as the Carnegie or Harvard papers, and is presented without attribution. Another third is attributed to sources through footnotes, but uses other authors' exact — or almost exact — language without quotation marks.

Senator Quits Montana Race After Charge of Plagiarism

<http://www.nytimes.com/2014/08/08/us/politics/john-walsh-drops-campaign-under-pressure-from-democrats.html>

By JONATHAN MARTIN AUG. 7, 2014 New York Times

Engineering Concerns for Accidents

Negligence-Materials and Their Use

- Very heavy loads
- Very hot loads
- High pressure
- Chemicals – burns, asphyxiation
- Radioactivity
- Electrical shocks

Chernobyl Nuclear Power Plant, Ukraine – Unit 4

April 26, 1986

- The explosion and fire released large quantities of radioactive particles into the atmosphere, which spread over much of the western USSR and Europe.
- The Chernobyl disaster was the worst nuclear power plant accident in history in terms of cost and casualties.
 - It and the Fukushima Daiichi nuclear disaster in 2011 are the only two classified as a level 7 event (the maximum classification) on the International Nuclear Event Scale.
- **One Bottom-Line Analysis:** There was a sudden and unexpected power surge, and when an emergency shutdown was attempted, an exponentially larger spike in power output occurred, **which led to a reactor vessel rupture at the seams and a series of steam explosions.**
 - Those with an engineering expertise in electronics had proceeded with the design without consulting engineers with nuclear expertise.
 - They tested turbines, but knew nothing about nuclear reactors.



Engineering Concerns - Pressures

- Make budget
- Make deadline
- Political pressure

- Possibly from managers who may not be engineers or scientists and who may not understand or care

Manufacturing Control and Extrapolation

An organization has purchased a device and wants to operate it at a temperature of 31°F, and asks the manufacturer if this is possible. The manufacturer has tested a temperature-sensitive part in it down to 50°F. What should it do?

An organization has purchased a device and wants to operate it at a temperature of 31°F, and asks the manufacturer if this is possible **and needs a response within hours**. The manufacturer has tested a temperature-sensitive part in it down to 50°F **and is warned by one its engineers that the device should not be expected to work well at 31°F**. What should it do?

An organization has purchased a device and wants to operate it at a temperature of 31°F, and asks the manufacturer if this is possible **and needs a response within hours because of political pressures---and it is known that it wants a positive answer**. The manufacturer has tested a temperature-sensitive part in it down to 50°F **and is warned by one its engineers that the device should not be expected to work well at 31°F, and knows that lives could depend on its response**. What should it do?

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The Challenger Disaster

The Space Shuttle *Challenger* was to be launched on January 28, 1986 from Cape Canaveral, Florida. **There were pressures within NASA and the manufacturer Morton Thiokol to keep space shuttle missions on time.**

The operation recommendation was to stay within engineering guidelines and to launch only within their experience base, which meant at temperatures of 50 °F or higher. MT engineers were against launching at lower T.

Thiokol management initially supported its engineers' recommendation to postpone the launch, but NASA staff opposed a delay. **The engineers were then told to think with their management hats on and not their engineering hats, and then they okayed the launch even at lower temperatures.**

The Challenger was launched at 11:38 AM, when the temperature was/had been 31 °F. **The O-ring seal in the right solid rocket booster failed at this low T, sending pressurized hot gas to the external fuel tank, causing separation.**



The Challenger broke apart 73 seconds into the flight.

The cabin hit the surface 2 minutes and 45 seconds after breakup, with the crew likely alive until then. **The shuttle had no escape system.**

Morton Thiokol had suspected the O-ring design since 1977.

Engineering Concerns - Pressures

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Safety vs. Costs

- In the late 1960's Ford rushed into production the subcompact Pinto (for 1971).
- Put gas tank between the rear axle and bumper. In a rear collision the tank could be punctured by exposed bolts. Failed testing at 21 mph, but Ford claimed it met then current federal safety standards.
- Could have placed the tank above the axle and used a rubber bladder in the tank.
- **Ford's analysis told them that improved designs were not cost efficient**, using NHTSA published estimated costs of death:



Estimated "Benefits" to Ford (Costs of Damage): \$200 K for each of the 180 burn deaths + \$67 K for each of the 180 serious burn injuries + \$700 for each of the 2,100 burned vehicles
= \$49.15 million potential costs due to safety consequences

Estimated "Costs" to Ford (of Improvement to avoid tank explosions):
\$11 for each of 11 million cars and 1.5 million light trucks
= \$137 million costs needed to be added for better safety

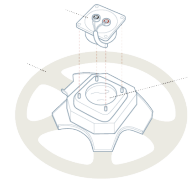
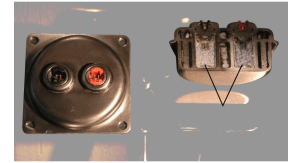
Public Trust

- Public trust/benefit – elevators, jets
 - For near term and long term consequences
- Engineer in public eye
- You have the responsibility before signing off on the project check
 - You must check it and approve it
 - You must be sure that you have the correct level of competence to do so

Takata Saw and Hid Risk in Airbags in 2004, Former Workers Say

New York Times By HIROKO TABUCHI

November 6, 2014



- Alarmed by a report a decade ago that one of its airbags had ruptured and spewed metal debris at a driver in Alabama, the Japanese manufacturer Takata **secretly conducted tests** on 50 airbags it retrieved from scrapyards, according to two former employees involved in the tests (in 2004, after working hours). (Takata is one of the world's largest suppliers of airbags, accounting for about one-fifth of the global market.)
- The steel inflators in two of the airbags cracked during the tests, a condition that can lead to rupture, the former employees said. **The result was so startling that engineers began designing possible fixes in preparation for a recall**, the former employees said.
- **But instead of alerting federal safety regulators to the possible danger**, Takata executives discounted the results and **ordered the lab technicians to delete the testing data from their computers** and dispose of the airbag inflators in the trash, they said.
- **That was four years before Takata says that it first tested the airbags.** The results from the later tests **led to the first recall over airbag rupture risks in Nov. 2008.**
- Takata airbags are blamed for at least 139 injuries, including 37 people who reported airbags that ruptured or spewed metal or chemicals. Today, 11 automakers have recalled more than 14 million vehicles worldwide because of rupture risks. Four deaths have been tied to the defect.
- Takata has said manufacturing problems, together with exposure to moisture in cars in humid regions, can cause the propellant to degrade. This can make the propellant burn too strongly when the airbag is deployed, rupturing the inflator and sending metal fragments into the car's interior and injuring the driver or passengers.

G.M. Ordered a Half-Million Replacement Switches 2 Months Before Recall

New York Times by HILARY STOUT and BILL VLASIC NOV. 10, 2014
<http://www.nytimes.com/2014/11/11/business/gm-ordered-replacement-ignition-switches-months-before-recall.html?hpw&rref=business&action=click&pgtype=Homepage&module=well-region®ion=bottom-well&WT.nav=bottom-well>

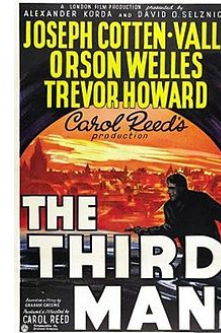
- **What was wrong?** The defective switch can, if jostled or bumped, shift to off or “accessory” mode without warning, causing a moving car to stall in traffic. The loss of power can deactivate the airbag system and impede power steering and brakes. **G.M. has said that the cars are safe to drive if nothing but the car key is on the ring.**
- Nearly two months before notifying federal regulators and the public that it was recalling cars with a dangerously defective ignition switch, General Motors placed an urgent e-mail order for 500,000 replacement switches to Delphi on Dec. 18, 2013.
- GM faces much litigation over the faulty switch. Delphi was in close contact with G.M. for years as engineers developed, and then tried to correct, the switch. **“Delphi is refusing to participate in the cover-up,”** said Robert C. Hilliard, one of three lead plaintiffs attorneys in federal multidistrict litigation against G.M. “They are fully and honestly disclosing what we have a right under the rules to know.”
- **GM mea culpa:** “These emails are further confirmation that our system needed reform, and we have done so. We have reorganized our entire safety investigation and decision process and have more investigators, move issues more quickly and make decisions with better data.”

11 Years Later, Woman’s Death Is Tied to G.M. Ignition Defect: In 2003 Jean Averill was the first of 13 victims that G.M.’s legal department linked to the defect in the internal report on the failure of GM to disclose a deadly safety defect in millions of its small cars. By RACHEL ABRAMS NOV. 10, 2014 <http://www.nytimes.com/2014/11/11/business/11-years-later-death-is-tied-to-gm-defect.html?action=click&contentCollection=Business%20Day&module=RelatedCoverage®ion=Marginalia&pgtype=article>

G.M. Recalls: Crisis in Auto Safety: The NYTimes has exposed missteps and delays by automakers and federal safety regulators in responding to deadly defects in cars during a **record year for recalls — more than 48 million in the U.S. through Sept.** SEPT. 19, 2014 <http://www.nytimes.com/interactive/2014/09/19/business/crisis-in-gm-auto-safety.html?action=click&contentCollection=Business%20Day&module=RelatedCoverage®ion=Marginalia&pgtype=article>

Fake Vaccine: On TV and in Movies

- Law and Order Season 15, Episode 14, Jan. 19, 2005: Sixteen people die from influenza after they received counterfeit flu vaccine shots.
- How does Exec. ADA Jack McCoy convince the jury that the Con Man who distributed the fake vaccine is guilty of manslaughter?
- By quoting black marketeer Harry Lime (Orson Welles) in the 1949 movie *The Third Man*, who greatly diluted penicillin he stole from military hospitals and sold it on the black market, killing many in post-WWII Vienna, where antibiotics were scarce, while speaking with Holly Martins at the top of Vienna's Ferris wheel:



Martins: Have you ever seen any of your victims?

Harry Lime: ... Victims? Don't be melodramatic. Look down there. Tell me. Would you really feel any pity if one of those dots stopped moving forever? If I offered you twenty thousand pounds for every dot that stopped, would you really, old man, tell me to keep my money, or would you calculate how many dots you could afford to spare?

Professor admits faking AIDS vaccine to get \$19M in grants

By Andy Soltis December 26, 2013 |

<http://nypost.com/2013/12/26/professor-admits-faking-aids-vaccine-to-get-19m-in-grants/>

- An Iowa State University professor **resigned after admitting he falsely claimed** rabbit blood could be turned into a vaccine for the AIDS virus.
- Dr. Dong-Pyou Han **spiked a clinical test sample** with healthy human blood to make it appear that the rabbit serum produced disease-fighting antibodies,
- The **bogus findings helped Han's team obtain \$19 million in research grants** from the National Institutes of Health, said James Bradac, who oversees the institutes' AIDS research.
- The remarkable findings were reported in scientific journals but **raised suspicions when other researchers could not duplicate Han's results**.
- The **NIH uncovered the scam** when it checked the rabbit serum at a lab and found the human antibodies.
- **Han resigned from his university post as an assistant professor** of biomedical studies in October. His case came to light this week when it was reported in the Federal Register.
- **Han agreed last month not to seek government contracts for three years**, the register said.

<http://blogs.desmoinesregister.com/dmr/index.php/2013/12/23/isu-researcher-quits-amid-allegations-of-aids-research-fraud-involving-millions-of-federal-dollars/article>

<http://ori.hhs.gov/content/case-summary-han-dong-pyou>

http://ori.hhs.gov/case_summary

Public Trust

- Public trust/benefit – elevators, jets
 - For near term and long term consequences
- Engineer in public eye
- You have the responsibility before signing off on the project check
 - You must check it and approve it
 - You must be sure that you have the correct level of competence to do so

Tacoma Narrows Bridge Collapse, 1940

- Opened to traffic on July 1, 1940 (as the third largest suspension bridge in the world behind the Golden Gate Bridge and the George Washington Bridge).
- When windy, it oscillated vertically, during construction and after it opened.
- Collapsed on November 7, 1940, during 40 mph winds.
- Failure due to aeroelastic flutter (dynamic instability of an elastic structure in a fluid flow, caused by positive feedback between the body's deflection and the force exerted by the fluid flow); sometimes more simply ascribed to the wind forcing a bridge resonance frequency.
- **Was this inevitable given the technology at the time? No.**
 - Failure to apply then standard engineering principles for wind on suspension bridge.
 - Initial plans were replaced with a slimmer, more elegant, less expensive design, and less rigid design.
- The “Pearl Harbor of Engineering.”



Volkswagen Emissions Investigation Zeroes In on Two Engineers (2015)

Wall Street Journal; By WILLIAM BOSTON Updated Oct. 5, 2015 1:21 p.m. ET
<http://www.wsj.com/articles/vw-emissions-probe-zeroes-in-on-two-engineers-1444011602> downloaded 10-8-15

“Two top Volkswagen **engineers who found they couldn't deliver as promised a clean diesel engine for the U.S. market** are at the center of a company probe into the installation of engine software designed to fool regulators, according to people familiar with the matter.”

“The two men, Ulrich Hackenberg, Audi's chief engineer, and Wolfgang Hatz, developer of Porsche's Formula One and Le Mans racing engines, were among the engineers suspended in the investigation of the emissions cheating scandal that ... triggered a world-wide recall to refit the engines to meet clear-air standards, these people said. ...Messrs. Hackenberg and Hatz, who didn't respond to requests for comment, **are viewed as two of the best and brightest engineers in German industry.**”

“The company has acknowledged that managers, **struggling to meet U.S. sales targets, masked the emissions of new-car engines to sell so-called clean diesel technology to skeptical American consumers.** The car maker said as many as 11 million vehicles carried a “defeat device,” **software that reduces tailpipe emissions only when the car is being tested, not on the road.**”

VW's U.S. Chief Apologizes, Says Engineers at Fault (2015)

Wall Street Journal; By MIKE SPECTOR and AMY HARDER Oct. 9, 2015, page B1--title

Text from: Online Updated Oct. 9, 2015 8:31 a.m. ET

<http://www.wsj.com/articles/volkswagen-u-s-ceo-says-he-didnt-know-in-2014-of-emissions-defeat-devices-1444316371> downloaded 10-9-15



“Volkswagen AG ’s top U.S. executive apologized for a yearslong deception but rejected suggestions there was a broad conspiracy at the German auto maker to cheat on diesel-emissions tests, instead **pointing to rogue engineers as likely culprits in the scandal.**”

“Michael Horn, head of Volkswagen Group of America, said during a congressional hearing on Thursday that he believed **“a couple of software engineers” were responsible for software that allowed nearly a half million diesel-powered cars sold in the U.S. since 2008 to dupe emissions tests.**”

““To my understanding this was not a corporate decision,” Mr. Horn said during a contentious U.S. House subcommittee hearing. “This was something individuals did.”

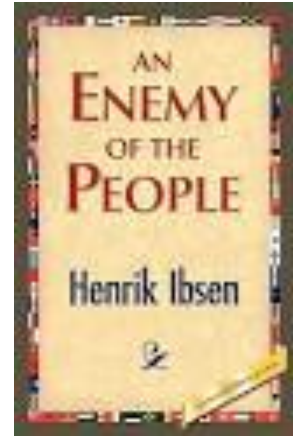
Handling the Situation

- Make stand with management – get needed resources to make sure all is right
- Last resort: Whistleblowing

Enemy of the People – play by Henrik Ibsen

Whistleblowing and Standing Alone

- Dr. Stockmann confirms his suspicion that the water from the town spa and baths are contaminated. He thinks the town will applaud his discovery.
- He is then warned that exposing this will financially ruin the town.
- The town's newspaper first agrees to print his story, then agrees with the mayor not to publish it.
- At a town meeting Dr. Stockmann reveals the report that the hot spring is being polluted by a tannery and how this fact is being suppressed by town corruption. The town marks him as an **enemy of the people** and is exiled from town.
- Dr. Stockman has alienated everyone and his house is vandalized, but stays true to his principles, even though he is standing alone with his family. He decides to accept his fate and become "**the enemy of the people**" if that is what it takes to do what is right.



1882 play



1978 movie

BF Goodrich – The Aircraft Brake Scandal

- On June 18, 1967, the B.F. Goodrich Wheel and Brake Plant in Troy, Ohio, received a contract to supply wheels and A7D brakes for the new Air Force aircraft, **which was highly desired by them so they could build into bigger relationship**. Before the Air Force could accept the brake, Goodrich had to present a report showing that the brake passed specified qualifying tests. **Early tests showed that the brakes heated too much, but corrective design changes were not allowed to be pursued**.
- There was brake failure at the June, 1968 flight tests.
 - Ensuing accusations by a former B.F. Goodrich employee, Kermit Vandivier, regarding qualification test report falsification and ethical misconduct on the part of specific B.F. Goodrich personnel, who were quoted as saying “... **we were not really lying. All we were doing was interpreting the figure the way we knew they should be. We were just exercising engineering license**”.
 - Senator William Proxmire held an inquiry on August 13, 1969.
- In 1972, Vandivier wrote the article, "Why Should My Conscience Bother Me," about the incident. His article forms the basis of what is now known as whistleblowing. He is considered a hero, a man who lost his job for doing the right thing.
- The case shows that whistleblowing was merely a symptom of larger ethical problems within both Goodrich and the aircraft brake industry as a whole from:
 - **engineering responsibility** regarding rationalizing ineptitude and failed innovation,
 - the case actors' **accountability for deficiencies in communications**,
 - **to governmental and industry culpability** in allowing erroneous qualification testing procedures to continue.

Boeing Dismisses Two Executives For Violating Ethical Standards

by J. LYNN LUNSFORD and ANNE MARIE SQUEO Staff Reporters of THE WALL STREET JOURNAL

Updated Nov. 25, 2003 8:26 a.m. ET <http://online.wsj.com/articles/SB106968087463716900>

Already battered by a string of ethics problems that have tarnished its image, **Boeing Co. fired its chief financial officer**, Michael Sears, and ... for engaging in what it called unethical behavior.

Boeing said that Mr. Sears violated company policy by communicating with Ms. Druyun to discuss her potential employment while she was still negotiating contracts with Boeing on behalf of the Pentagon. ... the two had attempted to conceal their alleged misconduct from a team of outside lawyers hired by the company to investigate.

Boeing has been plagued by other controversies in recent months. **Earlier this year, the company lost nearly \$1 billion in Air Force business after the government learned that Boeing employees possessed more than 25,000 pages of proprietary documents from rival Lockheed Martin Corp.**

NSU, Huizenga School of Business, Law and Ethics Classes

Case Study: Boeing – Air Force Ethics Scandal (Prepared by Prof. F. Cavico)

http://www.huizenga.nova.edu/course-materials/6240/cases/Boeing_AirForceEthicsScandal.htm

Boeing Ethics Woes Take Toll on the Bottom Line

New York Times by LESLIE WAYNE

Published: June 30, 2006 http://www.nytimes.com/2006/06/30/business/30boeing.html?_r=0

The Boeing Company, the aircraft maker and military contractor, announced yesterday that it would take second-quarter charges of up to **\$1.15 billion** as a result of a settlement of ethics investigations with the federal government and delays in a surveillance aircraft program for Australia and Turkey.... **It is a result of an investigation over the improper acquisition of proprietary documents from a rival, the Lockheed Martin Corporation**, that Boeing employees used to try to gain government rocket launching business. **The settlement also covers a second government investigation into Boeing's hiring of a former Air Force official** who had overseen Boeing contracts while at the Pentagon.

Boeing Code of Conduct (2012) – which employees must sign

The Boeing Code of Conduct outlines expected behaviors for all Boeing employees. Boeing will conduct its business fairly, impartially, in an ethical and proper manner, in full compliance with all applicable laws and regulations, and consistent with the Boeing values. In conducting its business, integrity must underlie all company relationships, including those with customers, suppliers, communities and among employees. The highest standards of ethical business conduct are required of Boeing employees in the performance of their company responsibilities. Employees will not engage in conduct or activity that may raise questions as to the company's honesty, impartiality, reputation or otherwise cause embarrassment to the company.

As an employee of The Boeing Company, I will ensure that:

- I will **not engage in any activity that might create a conflict of interest for me or the company.**
- I will **not take advantage of my Boeing position to seek personal gain** through the inappropriate use of Boeing or non-public information or abuse my position. This includes not engaging in insider trading.
- I will **follow all restrictions on use and disclosure of information.** This includes following all requirements for protecting Boeing information and ensuring that non-Boeing proprietary information is used and disclosed only as authorized by the owner of the information or as otherwise permitted by law.
- I will **observe fair dealing** in all of my transactions and interactions.
- I will **protect all company, customer and supplier assets** and use them only for appropriate company approved activities.
- Without exception, **I will comply with all applicable laws, rules and regulations.**
- I will promptly **report any illegal or unethical conduct to management** or other appropriate authorities (i.e., Ethics, Law, Security, EEO).

Every employee has the responsibility to ask questions, seek guidance and **report suspected violations of this Code of Conduct. Retaliation against employees who come forward to raise genuine concerns will not be tolerated.**

I have read the Boeing Code of Conduct and I do certify that:

- I understand the Boeing Code of Conduct.
- To the best of my knowledge, I am in compliance with the Boeing Code of Conduct.
- I will continue to comply with the Boeing Code of Conduct

<http://www.boeing.com/assets/pdf/companyoffices/aboutus/ethics/CoCEnglish.pdf>

Boeing Ethical Business Conduct Guidelines: http://www.boeing.com/assets/pdf/companyoffices/aboutus/ethics/ethics_booklet.pdf

Safety

The Chief Technology Officer at one of the two major airplane manufacturers learns that a process his company and their competitor use can lead to a safety flaw. What should he do?

An engineer at one of the two major airplane manufacturers discovers that a process her company uses can lead to a safety flaw. What should she do?

Professional Ethics – IEEE Code of Ethics

We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

1. to accept responsibility in making decisions consistent with the safety, health, and welfare of the public, and **to disclose promptly factors that might endanger the public or the environment;**
2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
3. to be honest and realistic in stating claims or estimates based on available data;
4. to reject bribery in all its forms;
5. to improve the understanding of technology; its appropriate application, and potential consequences;
6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;
7. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;
8. to treat fairly all persons and to not engage in acts of discrimination based on race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression;
9. to avoid injuring others, their property, reputation, or employment by false or malicious action;
10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

Epoxy

Somebody wonders whether he should use standard or fast set epoxy for anchor supports. What should he do?

Somebody wonders whether she should use standard or fast set epoxy for anchor supports in building the Big Dig Tunnel in Boston, since the spec sheet shows little difference between the two. What should she do?

On July 10, 2006, at least 26 tons of concrete from a ceiling panel fell on a car driving in the Big Dig Tunnel killing a woman and injuring her husband.

Powers Fasteners, Inc. was indicted for involuntary manslaughter for not disclosing that the Fast Set epoxy was subject to creep, which allowed the support anchors to pull free, and should not be used for long-term tensile loads.



Failing anchor bolt

Disposing of Waste

A company wonders how it should dispose of its waste chemicals, such as benzene, the pesticide lindane, polychlorinated dioxins, PCBs and phosphorus. What should it do?

A company wonders how it should dispose of its waste chemicals, such as benzene, the pesticide lindane, polychlorinated dioxins, PCBs and phosphorus, and wonders whether it would be okay to dispose of them in a large sealed-off, impermeable region in a large hole. What should it do?

A company disposes of its waste chemicals, such as benzene, the pesticide lindane, polychlorinated dioxins, PCBs and phosphorus, in a large sealed-off, impermeable region in a large hole that it now level land, and wants to sell this land to developers of schools and houses. What should it do?

A company disposes of its waste chemicals, such as benzene, the pesticide lindane, polychlorinated dioxins, PCBs and phosphorus, in a large sealed-off, impermeable region in a large hole that it now level land, and is being forced to sell this land to the developers of schools and houses. What should it do?

Love Canal

In 1942, the swimming hole “Love Canal” near Niagara Falls (a canal that had been started but not completed by William T. Love in the early 1890s) was bought by Hooker Chemical and Plastics (now part of Occidental Petroleum Co.). It lined it with cement and used it as a dump from 1942-50, dumping 21,000 tons of its waste chemicals, such as benzene, the pesticide lindane, polychlorinated dioxins, PCBs and phosphorus into it over an eight-year period. When it was filled they capped it with a cap that was impermeable to water, and leveled the land above it.



1982 movie

A character writes a play called *Return To Love Canal*.

Famous quote:

“Because nobody wants to produce a play about a couple that moved back to Love Canal. ... But that actually happened! ... Nobody wants to pay twenty dollars to watch people living next to chemical waste! They can see that in New Jersey!”

It sold the now-level land to the community for \$1.00 in 1953, it claims under protest due to pressure by the community. An elementary school and houses were built on the site, and then complaints about the stored materials began when chemical waste was released by heavy rains.

Love Canal became the “poster child” for waste dumps. New York State declared it a public health emergency in 1978, and relocated its residents. In settlements, Occidental paid \$94 M to NYS, \$129 M to the federal government, and >\$20 M to individual victims. It was cleaned up by NYS, which announced that cleanup was complete in 1994 and residents could return (enabled by a company renaming the area “Sunrise City”).

GE Dumping PCBs into the Hudson River

- **What happened?** PCBs were widely used as dielectric and coolant fluids, for example in transformers, capacitors, and electric motors. **General Electric manufacturing at discharged between 209,000–1,300,000 lb of polychlorinated biphenyl (PCBs) into the river from 1947 to 1977.** The PCBs caused extensive contamination of fish in the river and accumulated in sediments at the river bottom.
- **The Public Response:** In 1966, Pete and Toshi Seeger founded Hudson River Sloop Clearwater, which in the 1970s to force a clean-up of PCB contamination of the Hudson caused by GE and other companies.
- **The Government Response:** In 1976 the New York State Department of Environmental Conservation banned all fishing in the Upper Hudson.
 - In 1977, PCBs were banned in the United States.
 - In 1983, the United States Environmental Protection Agency (EPA) declared a 200-mile (322-km) stretch of the river, from Hudson Falls to New York City, to be a Superfund site requiring cleanup. **The dredging project is the most aggressive environmental effort ever proposed to clean up a river.**
- **GE Action:** GE began sediment dredging operations to clean up the PCBs on May 15, 2009, costing GE ~\$460,000,000.
 - This Phase One was completed in October 2009, with the removal of ~300,000 cubic yards of contaminated sediment.
 - Phase Two, targeting ~2.4 million cubic yards of PCB-contaminated sediment began in June 2011 and will take ~5 to 7 years to complete.

Events That Led to Flint's Water Crisis

- **April 25, 2014:** “The city **switches** its water supply from Detroit’s system to the Flint River ... as a cost-saving measure for the struggling ... city. Soon after, residents begin to complain about the water’s color, taste and odor, and to report rashes and concerns about bacteria.”



The Flint River, above, became Flint's source of water in April 2014. Brittany Greeson for The New York Times

- **August and September 2014:** “City officials issue **boil-water advisories** after coliform bacteria are detected in tap water.”

- **October 2014:** “A General Motors plant in Flint **stops** using municipal water, saying it corrodes car parts.”

- **January 2015:** “Detroit’s water system **offers** to reconnect to Flint, waiving a \$4 million connection fee. Three weeks later, Flint’s state-appointed emergency manager, Jerry Ambrose, **declines** the offer.”

- **March 3, 2015:** “Second testing **detects 397 parts per billion** of lead in drinking water at Ms. Walters’s home.” “The E.P.A. **does not require** action until levels reach **15 parts per billion ...**”

- **September 25-25, 2015** “A group of doctors... in Flint **urges** the city **to stop using** the Flint River for water after finding high levels of lead in the blood of children. State regulators **insist** the water is safe.”

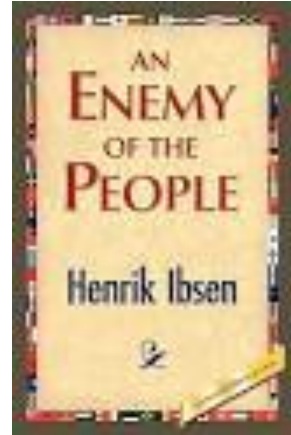
- **October 1:** “Flint city officials **urges** residents to stop drinking water ...”

- **October 16, 2015:** “Flint **reconnects** to Detroit’s water.”

Enemy of the People – play by Henrik Ibsen

Whistleblowing and Standing Alone

- Dr. Stockmann confirms his suspicion that the water from the town spa and baths are contaminated. He thinks the town will applaud his discovery.
- He is then warned that exposing this will financially ruin the town.
- The town's newspaper first agrees to print his story, then agrees with the mayor not to publish it.
- At a town meeting Dr. Stockmann reveals the report that the hot spring is being polluted by a tannery and how this fact is being suppressed by town corruption. The town marks him as an **enemy of the people** and is exiled from town.
- Dr. Stockman has alienated everyone and his house is vandalized, but stays true to his principles, even though he is standing alone with his family. He decides to accept his fate and become "**the enemy of the people**" if that is what it takes to do what is right.



1882 play



1978 movie

Decisions – The Needs of Society vs Those of an Individual

A civil engineer is hired by the state to design a road between two cities and is considering two routes. Route 1 has a travel time of 2 hours. Route 2 is 20 minutes shorter, but would require tearing down a house that has been in a family for over a century. The engineer asks the family if the state could purchase their house (for a very, very good price) and then tear it down, but the family would not sell at any price.

Should the engineer recommend to the state only the longer Route 1?

Should the engineer recommend to the state only the shorter Route 2 and to acquire the house by eminent domain (possibly by condemning the house)?

Should the engineer recommend to the state both possibilities?

In building the Cross Bronx Expressway, Robert Moses needed to raze many houses (as he had done using eminent domain many times before in many projects) and was told that if he moved part of the highway only a few blocks, the highway would still be as good, from all cost and transportation perspectives, but the character of the existing neighborhoods would be hurt much less.

What should he have done? What did he do?

Medical, Industrial and Societal Issues

An athlete wants his healthy legs to be cut off and replaced with artificial prostheses so he could run faster in races.

Should the manufacturer sell him the prostheses?

Should the surgeon perform this surgery?

New Technology/New Ethics - Games

A manufacturer of a home video game that uses helmet gear to sense the player's responses (from the neocortex), wants to increase revenue by adding non-game related functionality (subliminal images) to the video that could be used for subliminal:

- advertising of products
- sensing consumer response to products
- conducting of surveys of the person's interests and beliefs
- modifying how the user feels about specific products or issues

Are there technologies to do this in place?

Should there be rules in place to restrain such efforts and, if so, how should they be enforced?

Ethical Challenges Facing Entrepreneurs

- Who owns the initial intellectual property? Is part of it from your previous company?
- Who is really on the team? Who gets the equity? What happens when some on the initial team become less engaged?
- Do you tell the funders and investors the whole truth about product development?
- Do you tell the customers the whole truth about delays and flaws in the product?
- Do you tell the whole truth about earnings?
- Who owns the new products and data?

**In a survey,
35% of employees in the smallest startups (2-24 workers)
observed misconduct.
58% of this misconduct involved management.**

Professional Decisions:

The Job You Want

The Person They Want

A graduate student finishing his/her thesis applied for employment from companies A and B, received and then accepted the offer from company A, later received an offer from company B---which he/she prefers---and wonders whether it would be proper to then rescind his/her acceptance to company A and accept the offer from company B. What should he/she do?

A company makes an offer of employment to graduate student A finishing his/her thesis, but just learns that student B has applied for the same job and it prefers him/her and wonders whether it would be proper to rescind or try to convince the offer to student A so it can make one to student B. What should it do?

Professional Decisions: The Job You Want

A graduate student finishing his/her thesis applied for employment from companies A and B, received and then accepted the offer from company A, later received an offer from company B---which he/she prefers---and wonders whether it would be proper to then rescind his/her acceptance to company A and accept the offer from company B. What should he/she do?

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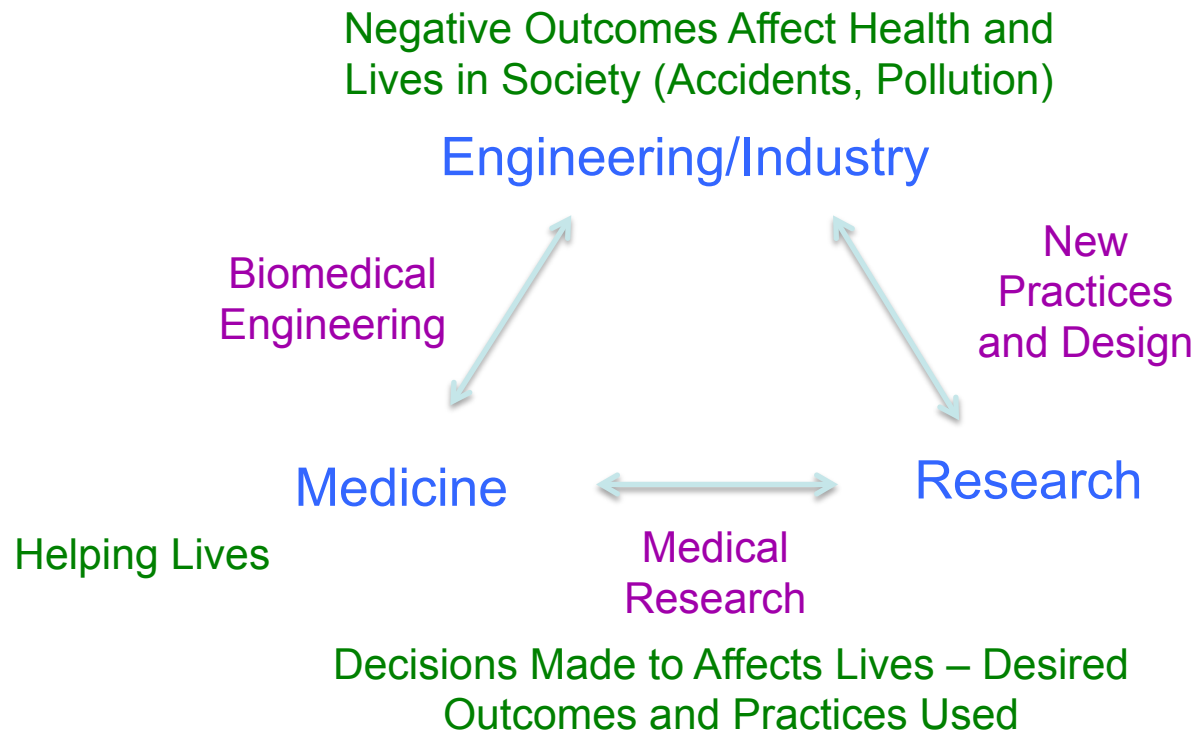
Professional Decisions: The Person They Want

A company makes an offer of employment to graduate student A finishing his/her thesis, but just learns that student B has applied for the same job and it prefers him/her and wonders whether it would be proper to rescind the offer to student A so it can make one to student B. What should it do?

A company makes an offer of employment to a graduate student A finishing his/her thesis, but just learns that student B has applied for the same job and it prefers him/her and wonders whether it would be proper to **try to convince student A from accepting, by purposefully and actively making the job seem to be undesirable and a bad match for him/her, so he/her would reject the offer,** so it can make one to student B. What should it do?

Commonalities in Engineering/Industrial, Research, and Medical Ethics

- Each is concerned with
 - The Public Trust
 - Evaluation of Cost Factors
 - The Choice of New vs. Standard Practices
 - Improper Shortcuts
 - How People and Animals are Treated



Let's continue our discussion

Ethics awareness information available at

<http://www.columbia.edu/~iph1/teaching.html>