

Engineering Ethics After a Disaster

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This presentation is dedicated to all those who lost loved ones and homes due to Hurricane Katrina.

Format of Presentation

- How engineers rank, ethically
- Codes of conduct
 - NSPE
 - LAPELS
- Engineers are human
- A tale of disaster
- Do the right thing (what is the right thing?)

1985 Survey (Kemper)

- 1000 Americans polled

<u>OCCUPATION</u>	<u>High or very high</u>
– Clergy	61%
– Physicians	48%
– Engineers	45%
– Public office holders	16%
– Car salesmen	6%

1990 Survey (Zinckgraf)

- 1000 Corporate Executives polled (forced choice)

– OCCUPATION Which most ethical

– Engineer	34%
– CPA	24%
– Doctor	17%
– Dentist	7%
– Lawyer	8%
– Other	10%

Engineering Ethics: Codes of Conduct

- ASCE
- NSPE
- ASME
- IEEE
- ASHRAE
- etc.....

Professional societies have similar codes of conduct

NSPE Code of Ethics
FUNDAMENTAL CANONS
RULES OF PRACTICE

#1

**Maintain safety, health & public
welfare**

NSPE Code of Ethics
FUNDAMENTAL CANONS
RULES OF PRACTICE

#2

**Perform services only in area of
competence**

NSPE Code of Ethics
FUNDAMENTAL CANONS
RULES OF PRACTICE

#3

**Public statements must be
objective and truthful**

NSPE Code of Ethics
FUNDAMENTAL CANONS
RULES OF PRACTICE

#4

**Be a faithful agent or trustee in
representing employer or client**

NSPE Code of Ethics
FUNDAMENTAL CANONS
RULES OF PRACTICE

#5

**Avoid deception in solicitation of
professional employment**

NSPE Code of Ethics
FUNDAMENTAL CANONS
RULES OF PRACTICE

#6

**Conduct oneself honorably,
responsibly, ethically, and
lawfully**

LAPELS Board

- Governed by two documents:
 - Law (LA Revised Statutes 37:681-37:703)
 - Rules of the Board (LA Administrative Code)
- Rules include Professional Conduct (Chapter 25)
 - Scope
 - Licensees
 - Services
 - Conflicts of interest
 - Improper solicitation
 - Conduct of advertising

LAPELS Rules of Conduct

- Rules are binding on every licensee
- Licensees:
 - Hold paramount public safety
 - Seal only acceptable work performed by licensee or under licensee's charge
 - Shall be objective and truthful in all reports, statements and testimony
 - Shall perform services only in area of competency

LAPELS Rules of Conduct

- Shall be faithful agents or trustees of employer and client
 - Shall disclose all known or potential conflicts of interest
- Shall avoid improper solicitation of professional employment or services
- Shall not make exaggerated, misleading, deceptive or false statements or claims about professional qualifications

Unconscious Bias

- Psychological studies
 - Our desires powerfully influence the way we interpret information
 - Even if we try to be objective and impartial

Unconscious Bias

- Most of us think
 - We are better than average drivers
 - Our kids are smarter than average
 - We are not too drunk to drive
- We erroneously conclude that our decisions are free from bias

Six aspects of human nature that leave an opening for bias

- AMBIGUITY

- Possibility of interpreting information in different ways

- ATTACHMENT

- Engineers have strong motivation to remain in a client's good graces

- APPROVAL

- CORPS: Vicksburg must ultimately reject or agree with the New Orleans District's levee design

Six aspects of human nature that leave an opening for bias

- **FAMILIARITY**

- People are more willing to harm strangers than people they know

- **DISCOUNTING**

- People are far more responsive to immediate consequences, rather than delayed, uncertain ones

- **ESCALATION**

- People may explain away minor oversights, sometimes without realizing it.
- Over time they build up and are recognized
- Sometimes people, instead of owning up, conceal the oversights

Human Bias

How can our biases impact our decisions?

Are we always impartial, fair, objective?

The World According to NJ

- In a galaxy long, long ago and far, far away, there was a planet named World.
- On this World, there was the greatest nation: the Union of States (US), which was a democracy.

The World According to NJ

- The US people were a hardy breed: an amalgam of different races, each fleeing persecution suffered in their home countries.
- Because of this, they had a reputation for rugged individualism, ingenuity and philanthropy.
- Unfortunately also because of their level of success, they suffered from rampant consumerism. The plight of their poor was often neglected. Their president and many congressmen were hard core businessmen.

A Tale of a City

- In World there was a very old city called Nuevo Bienville.
- NB was a prized vacation destination for all the peoples of World, due to
 - Historic architecture
 - Culture and celebrated holidays (Kno Cloz Day)
 - Music and food
 - In essence: its joy of living
- Most of NB's population called it home for generations

Everyone is Vulnerable

- Nuevo Bienville was founded at the mouth of the great Nagin River, near Lake Honore, and just off of the coast of the Gulf of Blanco
- Most of the city, with the exception of the oldest portions, was built below sea level, made possible by
 - Levees
 - Drainage canals
 - Invention of the large Tulane Wood Pump
- Mayor Nestle knew that this made Nuevo Bienville susceptible to “doomsday” flooding, should the protection system fail

Reasons for Vulnerability

- Protection system:
 - LEVEES
 - COASTAL WETLANDS

Reasons for Vulnerability

- Protection system: LEVEES
 - Levee system built after damage due to CAT 3 typhoon Betty fifty years prior
 - Weather analysts predict a period of time where typhoons would be stronger and more frequent

Reasons for Vulnerability

- Protection system: LEVEES
 - Subsidence slowly eroding elevation of levees
 - Covers several counties, each with a separate levee board, causing disparate designs, inspections, and maintenance

Reasons for Vulnerability

- Protection system: COASTLINE
MARSHES
 - Nagin River levee system built a century ago
 - Eliminated seasonal flooding of riverbank communities
 - Eliminated re sedimentation of delta, causing some loss of coastline

Reasons for Vulnerability

- Protection system: COASTLINE
MARSHES
 - Commerce canals, built to spur industrial growth
 - Allows saltwater intrusion
 - Some canals even acting as a funnel for storm surge

Typhoon Katie

- A CAT 5 typhoon hits NB
 - Storm surge causes long term flooding to 80% of homes
 - 1.5 million people remain displaced for months
- Emergency aid is slow and lackluster
- State and city governments near bankruptcy
- Largest urban disaster in recent history
 - No precedent available for guidance of recovery/rebuild efforts

Indecision and Agreement

- Indecision is rampant in Nuevo Bienville
 - Many residents await pledge of CAT3 or 5 protection system before they rebuild their homes
- Most agree that
 - Many people will loose \$\$\$ due to Katie
 - Many people will make \$\$\$ due to Katie

Recovery/rebuild Efforts Require Many Engineers

- Engineers are needed
 - Assessment of damage
 - Rebuilding of commercial, municipal, institutional, and residential structures
 - Repair of roads, bridges, and water, drainage and sewerage systems
 - Recovery of important industries such as the port, energy, and chemicals
 - Repair/improvement of storm surge protection

Ethical Dilemmas in Recovery/rebuild

We'll look at four hypothetical situations –
You be the judge of what is the best solution
to each

Dilemma 1

- Howe Longue PE, owner of Ultrasonic Testing Inc., a NDT firm that does pile testing, was contracted to measure the length of the sheet piles at one of the levee breaches by the local levee board.
- Howe knows that the ultrasound test method is only accurate when calibrated for the specific pile and the specific soil conditions after validation.
- Howe's test results indicate that the sheet piles are several feet shorter than those on design and construction drawings.

Dilemma 1

- Howe also realizes that this is a great opportunity
 - his company will get free national press
 - large contracts testing miles of levees nationwide if the discrepancy in pile length is shown to be true and the CORPS, who oversees such design, is suspect of improper design and oversight
- Another ultrasonic test on the site yielded similar results

Dilemma 1

- Howe should:
 - Immediately leak the news to the press – people need to know that they can't trust the CORPS or the levee system

Dilemma 1

- Howe should:
 - Write his report, emphasizing the test's limitations, as well as thoroughly answer the questions from the press, if approached

Dilemma 1

- Howe should:
 - Write his report, emphasizing the test's limitations, and refuse to speak to the press

Dilemma 1

- Howe should:
 - Write his report and speak to the press, emphasizing the capabilities of his company and putting the test limitations in fine print in the report

Dilemma 2

- Dudley Dewrite, PE, has worked for the Bienville Levee Board for decades
- He has a reputation of “telling it like it is”, but is also known as fair and levelheaded, and has decades of management and policy experience
- Governor Bonco has asked Dewrite for his opinion of what best to do with the hodgepodge levee boards (which have resulted in disparate levee designs, haphazard inspections, and confusion as to what is asbuilt - all playing a part in the failure of the levees due to Typhoon Katie)

Dilemma 2

- Dudley should:
 - Remain loyal to his employer and recommend keeping all boards intact, while promising to revamp inspections and review locations where differing levee types abut

Dilemma 2

- Dudley should:
 - Recommend that the boards be replaced by a single regional board, with “someone” like himself at the helm.

Dilemma 2

- Dudley should:
 - Recommend that the boards be replaced by a single regional board, although he risks losing his job.

Dilemma 2

- Dudley should:
 - Recommend that another regional oversight board be placed over the others, each local levee board reporting to the oversight board (in effect, another layer of government).

Dilemma 2

- Dudley should:
 - Refrain from comment, take early retirement and move to Kansas (far away from typhoons)

Dilemma 3

- Jane Beuro Krat, PE, is fairly high in the chain of command at the CORPS.
- Congress has authorized funds to repair the damage of the metro Neuvo Bienville levee system from Typhoon Katie.

Dilemma 3

- Jane knows the system may be in worst shape than previously imagined, but is confident that level CAT3 protection can be realized in about a year
- However, Jane is aware that larger storm surge is a risk to the city. Weather analysts predict a decade of increased frequency and severity in Gulf of Blanco storms

Dilemma 3

- Although the CORPS is proceeding with studies on CAT5 protection, Congress has yet to authorize \$\$ for CAT5
- Essentially the CORPS mission is public safety. However, if the CORPS safety net fails, it is immune to lawsuits

Dilemma 3

- Jane should:
 - Give Neuvo Bienville the best CAT3 protection that the CORPS can afford with the limited budget Congress has authorized in time for the next typhoon season, even though Jane believes the risk of a CAT5 storm hitting the area in the next 20 years more than justifies the cost of CAT5 protection

Dilemma 3

- Jane should:
 - Design a phased CAT3/CAT5 system (initially under the original CAT3 authorization) that will take ten years and local \$\$\$ and/or continued congressional support, but will ultimately afford the area CAT5 protection

Dilemma 3

- Jane should:
 - Organize a group within the CORPS that will rally as a unit and refuse to put the public at a level of risk that the CORPS deems unacceptable

Dilemma 3

- Jane should:
 - Quit engineering, move to Colorado with her dog Buffy, and buy a coffee shop

Dilemma 4

- Gudto Bea-king, PE, is a very powerful, wealthy, well-connected man. He rose from humble beginnings as a chemical engineer, the first college grad in his family.
- President Shrub has appointed him as the rebuild NB czar. His job is to oversee the recovery and rebuilding efforts along the entire Gulf of Blanco coast.

Dilemma 4

- Gudto, through meetings with local politicians and business leaders, knows that typhoon protection is key to getting evacuees back to the area.
- No one wants to take the time and effort to rebuild homes if the properties are still at risk.

Dilemma 4

- Gudto also knows that many hundreds of thousands of homeowners are affected, and the longer levee protection remains ??, many will sell out cheap.
- Large developers are now circling the area like vultures. These people are also influential and powerful men.

Dilemma 4

- Gudto should:
 - Council President Shrub, urging him to make CAT5 levee protection highest priority, so that the local home owners can get on with the repair of their homes: rebuilding Nuevo Bienville

Dilemma 4

- Gudto should:
 - Do nothing, letting the media create hysteria, which will drive down the prices, which will allow big developers to buy large tracts cheap. These powerful developers will then use their influence to get CAT5 protection, land prices will double overnight. Neuvo Bienville will then be rebuilt and have its storm protection.

Dilemma 4

- Gudto should:
 - Council President Shrub to focus on business, giving tax credits as incentives. If the Nuevo Bienville economy is revived, business can demand storm protection and homes will be rebuilt as businesses hire and bring in employees

Dilemma 4

- Gudto should:
 - Retire and buy that beautiful Garden District mansion (ten cents on a dollar) that his wife fell in love with on a tour of the ravaged city

Questions?

RENEW ORLEANS!!