

ENGINEERING ETHICS

Presented by:

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WHY ENGINEERING ETHICS?

- State laws and regulations for professional engineers often include ethics
- Employer rules for ethics and conflict of interest
- Professional society code of ethics
- Continuing education requirements

ASCE CODE OF ETHICS

First adopted in 1914

Uphold and advance the integrity, honor and dignity of the engineering profession

ASCE members required to abide by code of ethics and to report violations

Can be found at <http://www.asce.org/code-of-ethics/>

ASCE CODE OF ETHICS

Eight canons

Case study #1 focusing on canons 3, 4, 6, 8

ASCE CODE OF ETHICS

Canon 3-Engineers shall issue public statements only in an objective and truthful manner.

Canon 4-Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.

ASCE CODE OF ETHICS

Canon 6-Engineers shall act in such a manner as to uphold and enhance the honor, integrity, and dignity of the engineering profession.

Canon 8-Engineers shall, in all matters related to their profession, treat all persons fairly and encourage equitable participation without regard to gender or gender identity, race, national origin, ethnicity, religion, age, sexual orientation, disability, political affiliation, or family, marital, or economic status.

CASE STUDIES

ASCE-A Question of Ethics

Permission to use

Not representing ASCE

CASE STUDIES

I am not an attorney!

CASE STUDIES

Black and white are boring

Presentations in gray area

Interactive presentation

Information or questions

Opinions from attendees

Unmute for comments

ASCE opinion

CASE STUDY 1

ASCE-A Question of Ethics

Discouraging Women from STEM
Careers Would Violate ASCE's
Code of Ethics

July/August 2019

CASE STUDY 1

Chief executive of a national engineering society writes a monthly opinion column in their news magazine

Reports on a study comparing women's career choices in different countries

CASE STUDY 1

Study reports:

In countries such as Finland and Norway high school girls outperform boys in science literacy.

Have higher gender gaps in terms of women pursuing college degrees in STEM than countries with greater gender inequality in schools.

CASE STUDY 1

Executive in his column concludes that study proves that, with everything equal:

Men are more likely to pursue careers involving “things and mechanics.”

Women are more likely to pursue careers in “care or people oriented” professions.

CASE STUDY 1

Thoughts?

CASE STUDY 1

The rest of the column:

Executive goes on to speak dismissively of a female engineer's observation that she "had to work twice as hard to prove herself" in a male dominated profession

Questions whether this simply means it was twice as difficult for her to deliver the same results

CASE STUDY 1

Executive notes that:

1/3 of his society's student members are women

1/5 of graduate student members are women

5% of its professionally registered engineers are women

Concludes that this is because at stage of life when members advance into higher career levels "most women prefer to work part time or dedicate themselves completely to child rearing."

CASE STUDY 1

Further concludes that:

Most women would “rather have the flexibility to dedicate themselves to more important enterprises, like family.”

CASE STUDY 1

Also gave opinions on pay disparity:

Women “are more agreeable than men.”

Attributes to maternal instinct.

Women should “stop being agreeable when negotiating” salaries.

CASE STUDY 1

Suggests that:

Should put less effort into attracting women in STEM careers

Should instead invest in creating more gender equal societies

CASE STUDY 1

REACTION

Calls for executive's resignation

Support for executive; Cry censorship

Two engineering organizations accuse him of causing "immense damage" to the civil engineering profession.

National media pick up story

CASE STUDY 1 REACTION

Thoughts?

CASE STUDY 1

1. Can we all agree that he was stupid to write this?
2. Line between stupid and unethical?

CASE STUDY 1

ASCE ANALYSIS

Actual study conclusions:

Women who were strong in science were even stronger in reading comprehension.

Speculates women in less equal societies (less developed?) choose STEM careers for pay

Did he mis-represent study?

ASCE CANON 3

Engineers shall issue public statements only in an objective and truthful manner.

Did he violate this canon?

CASE STUDY 1

His organization probably had a stated goal of more women and minorities in engineering

Is he furthering the stated goal of his employer?

ASCE CANON 4

Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.

Did he violate this canon?

ASCE CANON 8

Engineers shall, in all matters related to their profession, treat all persons fairly and encourage equitable participation without regard to gender or gender identity, race, national origin, ethnicity, religion, age, sexual orientation, disability, political affiliation, or family, marital, or economic status.

Did he violate this canon?

ASCE CANON 6

Engineers shall act in such a manner as to uphold and enhance the honor, integrity, and dignity of the engineering profession and shall act with zero-tolerance for bribery, fraud, and corruption.

Did he violate this canon?

CASE STUDY 1

ASCE POSITION

Engineer not an ASCE member

Likely would have been found in violation of Canon 8 (gender, race, etc.)

Possibly in violation of Canon 3 (objective statements)

Maybe Canon 4 (faithful agent of client)

Maybe Canon 6 (integrity and dignity of profession)

CASE STUDY 1

ASCE POSITION

Everyone should be treated as individuals, without preconceived judgments based on appearance, origin, or other characteristics.

CASE STUDY 1

Higher standard applied to him because
of his position?

CASE STUDY 1

Alternative question?

Why is engineering profession not getting the best?

CASE STUDY 1

Final thoughts?

CASE STUDY 2

ASCE-A Question of Ethics
Engineers Are Not Infallible
March, 2020

ASCE CODE OF ETHICS

Canon 1-Engineers shall hold paramount the safety, health and welfare of the public...

Canon 2-Engineers shall perform services only in areas of their competence.

CASE STUDY 2

January, 1978-Hartford Civic Center roof collapses under moderately heavy snow.

Building unoccupied, but evening before had held 5,000 fans watching basketball game.

CASE STUDY 2

ENGINEERS ARE NOT INFALLIBLE

Roof had featured an innovative design with minimal need for interior columns.

Cheaper and better views

Due to complexity of structure, new state of the art structural software used.

CASE STUDY 2

ENGINEERS ARE NOT INFALLIBLE

Roof frame first assembled at ground level.

Inspectors found greater than expected deflections at some nodes.

Reported to engineers.

No action taken.

CASE STUDY 2

ENGINEERS ARE NOT INFALLIBLE

Roof frame lifted into position.

Maximum deflection found to be twice what design software had predicted.

Reported to engineers.

Engineers said difference from calculated was within normal expectations.

CASE STUDY 2

ENGINEERS ARE NOT INFALLIBLE

Subcontractor reported that support brackets for fascia panels would not fit due to excessive deflection.

Sub told to make adjustments.

CASE STUDY 2

ENGINEERS ARE NOT INFALLIBLE

One year after construction-Concerned citizen reported what he felt were dangerous deflections.

City officials contacted design engineer.

Engineer expressed confidence in design and said there was no problem.

CASE STUDY 2

ENGINEERS ARE NOT INFALLIBLE

Independent investigation after collapse revealed several major flaws.

Some compression members in top layer of frame overloaded by more than 800%.

Members buckled under snow load, with progressive failure of entire structure.

Misuse of design software led to underdesign.

CASE STUDY 2

ENGINEERS ARE NOT INFALLIBLE

Did the engineers violate canons 1 & 2?

1. Hold paramount the safety, health and welfare of the public
2. Perform services only in areas of competence

Unethical or just unfortunate error?

Where is the line?

CASE STUDY 2

ASCE POSITION

Design software is not a substitute for engineering judgment.

Overconfidence, obstinance, or unwillingness to recognize one's own fallibility may hinder engineer's ability to meet their ethical obligation to hold paramount the public health, safety and welfare.

CASE STUDY 2

ENGINEERS ARE NOT INFALLIBLE

What is the most important thing we can learn from this case?

Many of worst engineering failures had instances of unheeded warnings.

CASE STUDY 2

ENGINEERS ARE NOT INFALLIBLE

Don't ignore warnings on your
own projects!!!

CASE STUDY 2 ENGINEERS ARE NOT INFALLIBLE

Final thoughts?