Jennifer Harrell, PE Central Regional Engineer American Concrete Pipe Association jharrell@concretepipe.org







# Merriam-Webster

# **Definition of** *ethics*

**1 ethics:** the discipline dealing with what is good and bad and with moral duty and obligation

2a: a set of moral principles : a theory or system of moral values
b: the principles of conduct governing an individual or a group
c: a guiding philosophy

d: a consciousness of moral importance





# Where did our profession originate?

## 1771 AD John Smeaton







# At midnight on March 12, 1928, the St. Francis Dam failed.



# St. Francis Dam

- Completed 1926
- Elevation of 1800 ft
- 175 ft tall
- 32,000 acre-ft
- During construction, height raised by 10'
  - Twice
  - 205 ft tall
  - 38,160 acre-ft



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- 175 ft tall
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- During construction, height raised by 10'
  - Twice
  - 205 ft tall
  - 38,160 acre-ft
- 12.4 billion gallons of water surged down San Francisquito Canyon
- Largest piece: 10,000 tons
  - Found <sup>3</sup>/<sub>4</sub> mile downstream
- 439 deaths
  - 180 bodies never recovered
- City of LA paid \$14M





1928 San Gabriel Dam Fraud









# San Gabriel Dam

- Started Sept 1928
- Concrete gravity arch dam
- 512 feet high and 2,500 ft long,
- Volume of 3.8M cubic yards
  - When designed in 1927-28 it was the highest and largest concrete dam ever conceived
- In June 1929, the contractor ignited 193,000 lb of dynamite, removing 160,000 cubic yards of material
- A subsequent rockslide felled an additional 200,000 cubic yards of material
- Construction was stopped due to concern of a menace to life & property



# San Gabriel Dam

- The Contractor was accused of fraud by 2 engineers in excess of \$700k
- ASCE investigated the "whistleblowers" and both were stripped of their ASCE membership in 1932 for
  - Bringing injury on a brother engineer's reputation







1969-1971 BART Whistleblowers

1946 NSPE Code of Ethics *Ethics of Welfare* 





## **BART Automatic Train Control (ATC) System**

- 1969-1971 (3) BART EEs expressed concerns over safety defects in the system
- Management dismissed concerns
- BART Board of Directors voted to dismiss the engineers
  - Fired in Feb 1972
- The Institute of Electrical and Electronics Engineers filed a brief in support of the 3 engineers.
- In Nov 1972 an ATC failure caused a test train to run off the end of the elevated track and crash to the ground, injuring four people on board







# Micro Ethics

The behaviors of an individual

# Macro Ethics

The responsibilities of a profession as a collective group

- Initial focus was on Micro Ethics
- Gradually there is emerging consensus that personal ethics are not enough
- Professional ethics must also include an analysis and action on institutional action & policy
- Evolution of Engineering ethics incorporates Macro ethics

## The Responsibilities of a profession as a collective group

"The bottom line is that the things engineers do have consequences, both positive and negative, sometimes unintended, often widespread, and occasionally irreversible."

- CEO Norm Augustine Lockheed Martin
- The Bridge publication of the National Academy of Engineers













# **Micro Ethics**

The behaviors of an individual

# **Macro Ethics**

The responsibilities of a profession as a collective group

# **Meta Ethics**

The concept of what makes something moral/ethical (the right choice)

# Gallup Public Opinion - 2012

	% Very high/ High	% Average	% Very low/ Low
Nurses	85	12	3
Pharmacists	75	21	3
Medical doctors	70	26	4
Engineers	70	25	3
Dentists	62	33	4
Police officers	58	32	10
College teachers	53	34	10
Clergy	52	33	9
Psychiatrists	41	43	11
Chiropractors	38	46	11
Bankers	28	48	24
Journalists	24	45	30
Business executives	21	50	27
State governors	20	48	31
Lawyers	19	42	38

Does this drive us to achieve a higher ethical standard?

## Are we succeeding?

Please tell me how you would rate the honesty and ethical standards of people in these different fields -- very high, high, average, low, or very low? How about -- [RANDOM ORDER]? Sorted by % very high/high

	% Very high/ High	% Average	% Very low Low
Insurance salespeople	15	49	36
Senators	14	39	45
HMO Managers	12	52	27
Stockbrokers	11	48	39
Advertising practitioners	11	50	36
Members of Congress	10	34	54
Car salespeople	8	43	49
GALLOF			
		~	
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# **The Challenge**

Personal challenges create an atmosphere of doubt where people address the question, "Was I wrong or was I right?"



# **The Challenge**



If one judges action "A" to be the best course of action, why would one do anything other than "A?"

-Socrates

Always Black & White?



Socrates 470 BCE – 399 BCE

Akrasia (Greek  $\dot{\alpha}\kappa\rho\alpha\sigma(\alpha, "lacking command")$ , occasionally described as a lack of self-control or a weakness of will.

Code of the Highway

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### **Code of Ethics for Engineers**

#### Preamble

Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct.

#### I. Fundamental Canons

- Engineers, in the fulfillment of their professional duties, shall: 1. Hold paramount the safety, health, and welfare of the public.
- Perform services only in areas of their competence.
   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.
- Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.

#### II. Rules of Practice

#### Engineers shall hold paramount the safety, health, and welfare of the public.

- 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.
- Engineers shall approve only those engineering documents that are in conformity with applicable standards.
- 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.
- d. Engineers shall not permit the use of their name or associate in business ventures with any person or firm that they believe is engaged in fraudulent or dishonest enterprise.
- Engineers shall not aid or abet the unlawful practice of engineering by a person or firm.
- f. Engineers having knowledge of any alleged violation of this Code shall report thereon to appropriate professional bodies and, when relevant, also to public authorities, and cooperate with the proper authorities in furnishing such information or assistance as may be required.

#### 2. Engineers shall perform services only in the areas of their competence.

- Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.
- Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which

they lack competence, nor to any plan or document not prepared under their direction and control.

c. Engineers may accept assignments and assume responsibility for coordination of an entire project and sign and seal the engineering documents for the entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment.

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

- a. Engineers shall be objective and truthful in professional reports, statements, or testimony. They shall include all relevant and pertinent information in such reports, statements, or testimony, which should bear the date indicating when it was current.
- Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter.
- c. Engineers shall issue no statements, criticisms, or arguments on technical matters that are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly identifying the interested parties on whose behalf they are speaking, and by revealing the existence of any interest the engineers may have in the matters.

#### 4. Engineers shall act for each employer or client as faithful agents or trustees.

- Engineers shall disclose all known or potential conflicts of interest that could influence or appear to influence their judgment or the quality of their services.
- b. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties.
- c. Engineers shall not solicit or accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which they are responsible.
- d. Engineers in public service as members, advisors, or employees of a governmental or quasi-governmental body or department shall not participate in decisions with respect to services solicited or provided by them or their organizations in private or public engineering practice.
- Engineers shall not solicit or accept a contract from a governmental body on which a principal or officer of their organization serves as a member.

#### 5. Engineers shall avoid deceptive acts.

a. Engineers shall not falsify their qualifications or permit misrepresentation of their or their associates' qualifications. They shall not misrepresent or exaggerate their responsibility in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint venturers, or past accomplishments.

b. Engineers shall not offer, give, solicit, or receive, either directly or indirectly, any contribution to influence the award of a contract by public authority, or which may be reasonably construed by the public as having the effect or intent of influencing the awarding of a contract. They shall not offer any gift or other valuable consideration in order to secure work. They shall not pay a commission, percentage, or brokerage fee in order to secure work, except to a bona fide employee or bona fide established commercial or marketing agencies retained by them.

#### III. Professional Obligations

- 1. Engineers shall be guided in all their relations by the highest standards of honesty and integrity.
- Engineers shall acknowledge their errors and shall not distort or alter the facts.
- Engineers shall advise their clients or employers when they believe a project will not be successful.
- c. Engineers shall not accept outside employment to the detriment of their regular work or interest. Before accepting any outside engineering employment, they will notify their employers.
- Engineers shall not attempt to attract an engineer from another employer by false or misleading pretenses.
- Engineers shall not promote their own interest at the expense of the dignity and integrity of the profession.
- Engineers shall treat all persons with dignity, respect, fairness, and without discrimination.

#### 2. Engineers shall at all times strive to serve the public interest.

- Engineers are encouraged to participate in civic affairs; career guidance for youths; and work for the advancement of the safety, health, and well-being of their community.
- b. Engineers shall not complete, sign, or seal plans and/or specifications that are not in conformity with applicable engineering standards. If the client or employer insists on such unprofessional conduct, they shall notify the proper authorities and withdraw from further service on the project.
- c. Engineers are encouraged to extend public knowledge and appreciation of engineering and its achievements.
- d. Engineers are encouraged to adhere to the principles of sustainable development<sup>1</sup> in order to protect the environment for future generations.
- e. Engineers shall continue their professional development throughout their careers and should keep current in their specialty fields by engaging in professional practice, participating in continuing education courses, reading in the technical literature, and attending professional meetings and seminar.



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Objective & CANONS



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# Engineers' Creed

As a Professional Engineer, I dedicate my professional knowledge and skill to the advancement and betterment of human welfare.

## I pledge:

To give the utmost of performance;

To participate in none but honest enterprise;

To live and work according to the laws of man and the highest standards of professional conduct;

To place service before profit, the honor and standing of the profession before personal advantage, and the public welfare above all other considerations.

In humility and with need for Divine Guidance, I make this pledge. (Adopted June 1954)









Approved by the ASCE Board of Direction on October 26, 2020

#### CODE OF ETHICS THE AMERICAN SOCIETY OF CIVIL ENGINEERS

#### PREAMBLE

Members of The American Society of Civil Engineers conduct themselves with integrity and professionalism, and above all else protect and advance the health, safety, and welfare of the public through the practice of Civil Engineering.

Engineers govern their professional careers on the following fundamental principles:

- create safe, resilient, and sustainable infrastructure;
- treat all persons with respect, dignity, and fairness in a manner that fosters equitable
  participation without regard to personal identity;
- · consider the current and anticipated needs of society; and
- utilize their knowledge and skills to enhance the quality of life for humanity.

All members of The American Society of Civil Engineers, regardless of their membership grade or job description, commit to all of the following ethical responsibilities. In the case of a conflict between ethical responsibilities, the five stakeholders are listed in the order of priority. There is no priority of responsibilities within a given stakeholder group with the exception that 1a. takes precedence over all other responsibilities. <sup>1</sup>

#### CODE OF ETHICS

#### 1. SOCIETY

#### Engineers:

- a. first and foremost, protect the health, safety, and welfare of the public;
- b. enhance the quality of life for humanity;
- c. express professional opinions truthfully and only when founded on adequate knowledge and honest conviction;
- d. have zero tolerance for bribery, fraud, and corruption in all forms, and report violations to the proper authorities;
- e. endeavor to be of service in civic affairs;
- f. treat all persons with respect, dignity, and fairness, and reject all forms of discrimination and harassment;
- acknowledge the diverse historical, social, and cultural needs of the community, and incorporate these considerations in their work;
- h. consider the capabilities, limitations, and implications of current and emerging technologies when part of their work; and
- report misconduct to the appropriate authorities where necessary to protect the health, safety, and welfare of the public.

#### 2. NATURAL AND BUILT ENVIRONMENT

#### Engineers

- a. adhere to the principles of sustainable development;
- b. consider and balance societal, environmental, and economic impacts, along with opportunities for improvement, in their work;
- c. mitigate adverse societal, environmental, and economic effects; and
- d. use resources wisely while minimizing resource depletion.

#### 3. PROFESSION

#### Engineers:

- a. uphold the honor, integrity, and dignity of the profession;
- b. practice engineering in compliance with all legal requirements in the jurisdiction of practice;
- c. represent their professional qualifications and experience truthfully;
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- e. promote mentorship and knowledge-sharing equitably with current and future engineers;
- f. educate the public on the role of civil engineering in society; and
- g. continue professional development to enhance their technical and non-technical competencies.

#### 4. CLIENTS AND EMPLOYERS

#### Engineers:

- a. act as faithful agents of their clients and employers with integrity and professionalism;
- b. make clear to clients and employers any real, potential, or perceived conflicts of interest;
- c. communicate in a timely manner to clients and employers any risks and limitations related to their work;
- present clearly and promptly the consequences to clients and employers if their engineering judgment is overruled where health, safety, and welfare of the public may be endangered;
- e. keep clients' and employers' identified proprietary information confidential;
- f. perform services only in areas of their competence; and
- approve, sign, or seal only work products that have been prepared or reviewed by them or under their responsible charge.

#### 5. PEERS

#### Engineers:

- a. only take credit for professional work they have personally completed;
- b. provide attribution for the work of others;
- c. foster health and safety in the workplace;
- d. promote and exhibit inclusive, equitable, and ethical behavior in all engagements with colleagues;
- e. act with honesty and fairness on collaborative work efforts;
- f. encourage and enable the education and development of other engineers and prospective members of the profession;
- g. supervise equitably and respectfully;
- comment only in a professional manner on the work, professional reputation, and personal character of other engineers; and
- report violations of the Code of Ethics to the American Society of Civil Engineers.

<sup>1</sup>This Code does not establish a standard of care, nor should it be interpreted as such.





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   communicate in a timely manner to clients and employers any risks and limitations related to their work:
- d. present clearly and promptly the consequences to clients and employers if their engineering judgment is overruled where health, safety, and welfare of the public may be endangered;
- judgment is overtued where essait, sharey, and we nate of the polarc may be ensangered, e. keep clearly and employers' identified proprietary information confidential; f. perform services only in areas of their competence, and g. approve, sign, or seal only work products that have been prepared or reviewed by them or under their responsible charge.

## 5. PEERS

- only take credit for professional work they have personally completed; а.
- provide attribution for the work of others;
- foster health and safety in the workplace;
- promote and exhibit inclusive, equitable, and ethical behavior in all engagements with colleagues;
- act with honesty and fairness on collaborative work efforts;
- encourage and enable the education and development of other engineers and prospective members of the profession;
- supervise equitably and respectfully;
- comment only in a professional manner on the work, professional reputation, and personal character of other engineers; and
- report violations of the Code of Ethics to the American Society of Civil Engineers.









### I. Fundamental Canons

Engineers, in the fulfillment of their professional duties, shall: 1. Hold paramount the safety, health, and welfare of the public.

### 1. SOCIETY

- Engineers:
  - a. first and foremost, protect the health, safety, and welfare of the public;







# The Environmen

ASCE

**CANON 1:** Engineers shall hold paramount the **safety, health, and welfare of the public** and shall strive to co**development** in the performance of their professional duties.mply with the principles of **sustainable** 

Professional Obligations: 2(d) Engineers are encouraged to adhere to the principles of sustainable development in order to protect the environment for future generations.







## **Sustainable Development** is an organizing principle for

meeting <u>human development</u> goals while simultaneously sustaining the ability of natural systems to provide the <u>natural</u> <u>resources</u> and <u>ecosystem services</u> on which the economy and society depend.



# Institute for Sustainable Infrastructure

The Institute for Sustainable Infrastructure (ISI) is the hub of a unique community of organizations and individuals involved in the planning, design, construction, and maintenance of infrastructure. Based in Washington, DC, the organization was created for a single purpose: to develop and maintain a sustainability rating system for all civil infrastructure.

sustainableinfrastructure.org







# Institute for Sustainable Infrastructure Envision

sustainableinfrastructure.org

# 64 Sustainability & Resilience Indicators, aka "Credits" based on 5 categories:

Quality of Life

Leadership

**Resource Allocation** 

Natural World

Climate & Resilience



# **The Environment**

## **Resilience:** The ability to PREPARE, PLAN FOR, ABSORB, RECOVER FROM, or more SUCCESSFULLY ADAPT to adverse events

AASHTO – American Association of State Highway Transportation Officials



# "Every \$1 invested in disaster mitigation by three federal agencies saves society \$6."

- Natural Hazard Mitigation Saves: 2017 Interim Report

"40 to 60 percent of small businesses don't reopen after a disaster, and 90 percent fail within a year unless they can resume operations within five days.."

- Pew Charitable Trust, May 15, 2019

WHEN FLOODED TURN AROUND DON'T DROWN

**Resilience is Critical** 



WIKIPEDIA The Free Encyclopedia **Sustainable Development** is an organizing principle for meeting human development goals while simultaneously sustaining the ability of natural systems to provide the <u>natural</u> resources and <u>ecosystem services</u> on which the economy and society depend.

# **Resilience:** The ability to PREPARE, PLAN FOR, ABSORB, RECOVER FROM, or more SUCCESSFULLY ADAPT to adverse events

## Future Proofing:

WHEN FLOODED TURN AROUND DON'T DROWN resilience planning strategies that accommodate future events and changes that ensure infrastructure facilities do not become prematurely obsolete

# Case Study

# 2011 Hurricane Irene:

- More than 2000 culverts damaged in Vermont alone
- One 14' CMP was washed out and VTrans chose to replace it with a precast 28x7 3-sided box culvert
- FEMA deemed the precast culvert an "upgrade" and refused reimbursement.

"As a matter of federal policy, it makes no sense to use federal tax dollars to put back in place the same size culverts that just blew out. If they didn't survive the last flood, they aren't likely to survive the next. Rebuilding to these higher standards now will save lives, and lots of money in the long run."

- Senators Leahy, Sanders, & Welch



# **Continuing Education**

**Professional Obligations: 2(e)** Engineers shall continue their professional development throughout their careers and should keep current in their specialty fields by engaging in professional practice, participating in continuing education courses, reading in the technical literature, and attending professional meetings and seminars.





# COVID-19









## Waivers for Continuing Education:

- Alaska,
- Arizona,
- Idaho,
- Kansas,
- New Jersey,
- Oklahoma,
- Tennessee,
- Texas

# Out With the Old

Macro /

Micro

- Commute
- Cubicle Life
- Lunch Plans
- Mentoring

# In With the New

- Childcare
- Motivation
- Depression
- Virtual interaction





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