Engineering Ethics

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References:
Outline

- Why study engineering ethics?
- Stages of Moral Development
- Ethical Responsibility
- Professionalism
- Codes of Ethics
- Professional Responsibilities
- Conclusions
Morality and Ethics

- Concerns the goodness of voluntary human conduct that affects the self or other living things
- Morality (Latin *mores*) usually refers to any aspect of human action
- Ethics (Greek *ethos*) commonly refers only to professional behavior
Why study ethics?

- To responsibly confront moral issues raised by technological activity
- To recognize and resolve moral dilemmas
- To achieve *moral autonomy*
Moral Dilemmas

- Situations in which two or more moral obligations, duties, rights, or ideals come into conflict

- To resolve we must
  - identify the factors,
  - gather facts,
  - rank moral considerations,
  - consider alternative courses of actions, and
  - arrive at a judgment
Stages of Moral Development

- **Pre-conventional Level**
  Whatever benefits oneself or avoids punishment

- **Conventional Level**
  Uncritical acceptance of society’s rules

- **Post-conventional Level**
  Moral autonomy
Moral Autonomy

- Autonomous individuals think for themselves and do not assume that customs are always right.
- They seek to reason and live by general principles.
- Their motivation is to do what is morally reasonable for its own sake, maintaining integrity, self-respect, and respect for others.
An example of moral autonomy

“One who breaks an unjust law must do so openly, lovingly, and with a willingness to accept the penalty. I submit that an individual who breaks a law that conscience tells him is unjust and willingly accepts the penalty… is in reality expressing the highest respect for the law.” Rev. Martin Luther King, Jr. in Letter from a Birmingham Jail, 1963.
The Existence of Right and Wrong

- **Principle:** Certain aspects of right and wrong exist objectively, independent of culture or personal opinion

- Accepting this principle is essential for ethics to discern an objective reality rather than just define a subjective standard
Virtue Ethics

- "The unexamined life is not worth living" (Socrates, c.470-399 B.C.)
- "The happy life is thought to be virtuous; now a virtuous life requires exertion, and does not consist in amusement" (Aristotle, 384-322 B.C.)
Simple Model of a Person

- Action
  - Decision
    - Will
      - Emotions
      - Mind
The Four Main Virtues

- **Prudence** (mind): to think about a moral problem clearly and completely
- **Temperance** (emotions): control attraction to positive emotions
- **Fortitude** (emotions): control aversion for negative emotions
- **Justice** (will): choose according to truth and fairness.
Habits and Morals

- A person has a unique ability to choose between good and bad.
- This is acquired through training, the formation of habits.
- A class of good habits exists for each of the three parts of the psyche.
- A virtue is the customary direction of one part of the psyche toward moral good.
- Acquiring virtues is analogous to acquiring athletic abilities.
A fundamental principle of morality:

People should try insofar as possible to continue to progress in the moral life
Ranking of Ethical Values

- Selecting principles and methods: consistency
- Importance of objects, actions, and attitudes
- Ranking of virtues:
  - Justice vs. Malice
  - Temperance vs. Indulgence
  - Fortitude vs. Cowardice
  - Prudence vs. Negligence
Exterior and Interior Ethics

- Analyzing the goodness of actions viewed from outside the person
- Analyzing the internal attitudes and personal intentions of the individual
Analyzing Exterior Acts

- **Who** is involved?
  - List all characters
- **What** are their interests?
- **When**? If relevant
- **Where**? If relevant
- List each option and their possible consequences for each character (an event tree format is helpful)
Evaluating Exterior Acts

- List options and their consequences
- Classify **good** and **bad** consequences
- **Importance** of each consequence: high, moderate, low, or zero
- **Likelihood** of each consequence: high, moderate, low, or zero
- Weigh the consequences and decide
Analyzing Attitudes

- **Why** might this action be chosen?
- *Intention* is the purpose for which an action is done
- Attitudes toward an action can be classified as: approval, disapproval, mixed, and indifferent
- Good intentions create good habits: “You become what you do”
Judging Intention

- Examine attitudes: approval or disapproval of the consequence
- Strength of attitude: strong, tolerate, weak
- Effect on your character
- Effect on others
Limits on responsibility

- **Lack of knowledge**: ignorance of certain aspects of the situation
- **Lack of freedom**: threats of violence, or acting under the influence of alcohol or drugs, or by force of habit
- **Lack of approval**: insufficient time for reflection
- Knowledge, freedom, and responsibility, can exist in varying degrees
Professionalism
What is a professional?

- Possesses specialized knowledge and skills
- Belongs to and abides by the standards of a society, e.g., AWMA
- Serves an important aspect of the public good
What is a professional engineer?

- Has a bachelor’s degree in engineering from an accredited school
- Performs engineering work
- Is a registered P.E.
- Acts in a morally responsible way while practicing engineering
A Professional Engineer

- Can serve an employer or work independently for clients
- Must satisfy two general criteria:
  2. Accept ethical responsibilities to the public, their employers, clients, colleagues, and subordinates.
A code of ethics isn’t something you post on a bulletin board. It’s something you live every day.
Engineers shall uphold and advance the integrity, honor, and dignity of the engineering profession by:

- using their knowledge and skill for the enhancement of the human race;
- being honest and impartial and serving with fidelity the public, their employers, and clients;
- striving to increase the competence and prestige of the engineering profession.
Fundamental Canons

- Engineers shall
  - *hold paramount the safety, health, and welfare of the public in the performance of their duties;*
  - *perform service only in areas of their competence;*
  - *issue public statements only in an objective and truthful way;*
  - *act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest;*
Fundamental Canons (Continued)

- build their professional reputations on the merits of their services;
- act in such manner as to uphold and enhance the honor of the engineering profession;
- continue their professional development throughout their careers, and shall provide opportunities for the professional development of those engineers under their supervision.
Engineer’s Responsibilities

- Safety
- Environment
- Employer - Client
Safety

- “A ship in harbor is safe, but that is not what ships are built for.” (John Shedd)
- “A thing is safe if its risks are judged to be acceptable.” (William Lowrance)
- “A thing is safe if, were its risks fully known, those risks would be judged acceptable in light of settled value principles.” (Martin & Schinzinger)
Environment

- “I am therefore I pollute.”
  (Louis J. Thibodeaux)
- Up there with economics and safety among the main professional responsibilities of the engineer
- Waste avoidance and minimization
- Treatment of continuous emissions
- Proper final disposal of waste
Responsibility to Employers

- Collegiality—team work
- Loyalty
- Respect for authority
- Confidentiality
- Avoid conflicts of interest
- Act as faithful agent
The Athenian Oath

- We will never bring disgrace on this our City by an act of dishonesty or cowardice. Let City = Engineering Profession.
- We will fight for the ideals and Sacred Things of the City both alone and with many.
- We will revere and obey the City’s laws, and do our best to incite a like reverence and respect in those who are prone to annul them or set them at naught.
- We will strive increasingly to quicken the public’s sense of civic duty.
- Thus in all these ways we will transmit this City, not only not less, but greater and more beautiful than it was transmitted to us.

(from A Book of Virtues, by William Bennett)
Conclusions

- Engineering is our profession, not just a job.
- Study of engineering ethics can guide us in resolving the moral dilemmas we might encounter.
- Being responsible is what a professional is all about.
- Our goal must be to become morally autonomous in the performance of our duties.
It’s been nice, but... I’d rather be sailing!