

Lecture: Engineers in Industry

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Professional Conduct in Industry

• Be Professional:

- Prioritize tasks effectively
- Give constructive criticism
- Maintain a positive attitude
- Accept challenges while balancing workload
- Communicate clearly and concisely
- Listen and understand well
- Review and verify your work

• Training & Development:

- Take full advantage of training for the job
- Gain experience needed to obtain a P.Eng. license

• Common Transition Challenges:

- Adjusting to corporate culture and expectations
- Accepting routine work
- o Balancing ambition and realistic initiative

Gaining recognition and acceptance

Engineers in Management

Roles and Responsibilities:

- Manage resources (people, materials, finances) to achieve goals
- Focus on people, communication, collaboration, and alignment
- Lead teams, develop strategy, motivate effectively

Key Skills for Leadership:

- Vision and strategic planning
- Communication and role modeling
- Monitoring and organizing efforts

Pros:

- Financial rewards
- Pride, achievement, autonomy
- Meaningful challenges

Cons:

- Stress and long hours
- Reduced personal freedom
- Ethical dilemmas, especially in decision-making

Engineers in Private Practice

Nature of Work:

- Direct provision of services to public as a consultant
- Legal and business responsibilities increase

Core Responsibilities:

- Engineering design and feasibility studies
- Project management and technical advice
- Serving as an expert witness

Additional Requirements:

- Business skills and financial stability
- Excellent people skills and reputation
- High work ethic and confidence

Rewards:

- Autonomy, responsibility, potential income
- Professional pride

Drawbacks:

- · High risk of business failure
- Greater legal liability
- Ethical challenges and family-life impact



Ethical Challenges in Industry

Typical Dilemmas:

- Conflicts between engineering ethics and corporate goals
- Conflicts of interest, confidentiality breaches, misuse of trade secrets
- Unethical management behavior

Degrees of Conflict:

- Violations of:
 - Law
 - Code of Ethics
 - o Personal conscience

Response Options:

- 1. Stay and try to correct issue
- 2. Whistleblow to authority
- 3. Resign in protest

Onstituency Responsibilities

Group	Corporation's Role	Engineer's Role
Owners	Maximize profit	Serve employer loyally and professionally
Stakeholder s	Maintain relationships to ensure profits	Treat stakeholders ethically and fairly
Society	Protect reputation (only if profitable)	Protect public safety as paramount duty

Example: Conflict of Interest

Situation:

An engineer tasked with selecting a contractor holds stock in one of the bidding companies.

Ethical Options:

- Disclose the conflict
- Refuse the assignment
- Sell the stock before decision
- Take extra precautions to ensure fairness

Ethical Problems in Management

- More ethical risk due to influence over others
- Responsibilities include:
 - Avoiding title misuse and unlicensed personnel
 - Ensuring fair hiring, promotions, dismissals
 - Maintaining professional competence and integrity

Case Study: Hurricane Katrina (2005)

Findings:

- Three major floodwalls failed due to poor design and unstable soils
- Corps of Engineers knew of soil instability but failed to act
- Neglect amplified storm impact, causing 1,000 deaths and widespread destruction
- Demonstrates ethics failures in:
 - Risk evaluation

- Infrastructure design
- Public safety consideration

TEthical Problems in Private Practice

- Includes all problems from industry and management, plus:
 - Supplier and client conflicts of interest
 - Pressure to engage in unethical contracting practices
 - Restrictions on self-promotion and advertising
 - Engineering seal misuse
 - o Confidentiality dilemmas

Quality-Based Selection (QBS)

- Steps:
 - 1. Select based on qualifications and competence
 - 2. Negotiate fee afterward
- Goal: Avoid lowest-bid pitfalls and preserve engineering quality
- Challenge: Can be contentious due to lack of transparency

Sectivity: Unethical Conduct Areas in Industry

Identify unethical conduct related to:

1. International trade

- 2. Environmental practices
- 3. Employment conditions
- 4. Customer relations
- 5. Shareholder deception
- 6. Supplier practices
- 7. Social responsibility

Dispute Scenario: Engineer vs. Client

Situation:

Engineer A refuses to deliver design drawings to a client who wants to revise the project with another engineer, citing safety concerns.

Question:

Is it ethical to release the drawings under pressure?

Case Reference: NSPE Case No. 84-4

View case

Core Principles:

- Honesty and integrity in methods and reporting
- Fairness and credit to team members
- Responsibility to public safety, environment, and human rights

Research with Human Subjects

- Informed Consent: Must be clear, signed, and voluntary
- Risk-Benefit Analysis: Avoid unnecessary harm
- Special Populations: Provide additional safeguards for:
 - Children
 - Dependent individuals
- Privacy and Confidentiality: Maintain anonymity

Animal Testing Ethics

- Use only when alternatives don't exist
- Minimize numbers and suffering
- Avoid inhumane restraints or cruel methods
- End suffering with humane euthanasia when necessary

Example: Medical Student Ethics

U of T survey:

- Reports of students pressured to:
 - Perform unnecessary procedures
 - Conduct unsupervised psychotherapy
 - Mislead patients for teaching purposes
- Highlights systemic ethical training issues

In Review Questions

Q1: According to the PEO Code of Ethics, an engineer should:

Answer: (b) Constructively point out technical errors made by another engineer.

Q2: An engineer may be guilty of misconduct if they:

Answer: (d) Loaned their seal to an unlicensed person and applied their seal without review.