



## **Ethics and Sustainability**

Young Engineers Forum

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Clean, Reliable On-site Energy

## SAFE HARBOR STATEMENT

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## KEY LEARNING OBJECTIVES

- The changing role of engineers.
- The increasing need for non-technical skills.
- Ideology, ethics, and a social contract.
- Questions to ponder – engineers, technology, society, and the environment.

Is sustainability an ethical requirement of engineers?

# ENGINEERING IS CHANGING

Today's engineers must be able to:

- Understand goals.
- Identify and communicate mechanisms.
- Provide objective and reliable advice.
- Persuade relevant authorities that benefits justify the investment.
- Mobilize resources.
- Create and maintain highly motivated teams.
- Ensure all relevant factors are considered.
- Ensure that systems can be successfully operated and maintained.

Engineering is an occupation transforming into a profession.

## NEW CHALLENGES ARE EMERGING

Engineers are facing more than technical challenges:

- Social
- Economic
- Environmental
- Cultural

The engineering culture must change to meet these challenges.

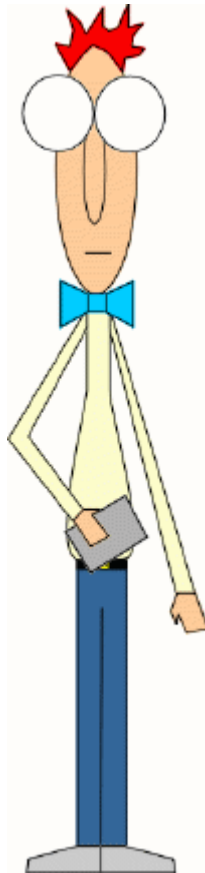
## SKILLS MAY BE LACKING

“Many engineers fall short on the strong interpersonal skills needed to forge consensus in large organizations and to deal effectively with customers and vendors. Without extensive exposure to the humanities, many engineers also lack broad cultural references as well as good verbal and writing abilities.”

- Sharon Beder

The “professional” skill set is different from the “occupational” skill set.

## HOW ARE ENGINEERS VIEWED TODAY?



- Male.
- Socially inept.
- Politically naïve.
- Aligned with self-serving developers.

This stereotype has led to the commoditization of engineering.

## PERCEPTION IS REALITY

“Being seen as people who are mainly pre-occupied with technical issues (to the exclusion of all else, unwilling or unable to appreciate contextual imperatives or to contribute effectively to business or political decisions) has been the main factor leading to the view of engineering as a commodity to be purchased when needed – even outsourced – not a critical strategic capability requiring long-term investment and development, or an integral part of decision-making.”

- Sharon Beder

The future role of engineers will be far more than as technical functionaries.

# COMPARISON OF SKILL SETS

## OCCUPATION

- Technical skills
- Problem-solving
- Analytical

## PROFESSION

- Technical skills
- Problem-solving
- Analytical
- Social
- Environmental
- Communication
- Ethics
- Economic

“Soft” skills are becoming valuable and essential tools in an engineer’s tool bag.

## WHAT MUST THE NEW ENGINEER DO?

Develop an “understanding and commitment to professional and ethical responsibilities.”

Develop an “intuitive ‘feel’ for the incalculable complexity of engineering practice in the real world.”

Source: Sharon Beder

Engineers must be capable of providing solutions to “non-technical” problems – legislation, regulation, taxes, public pressure.

## PROFESSIONAL IDEOLOGY

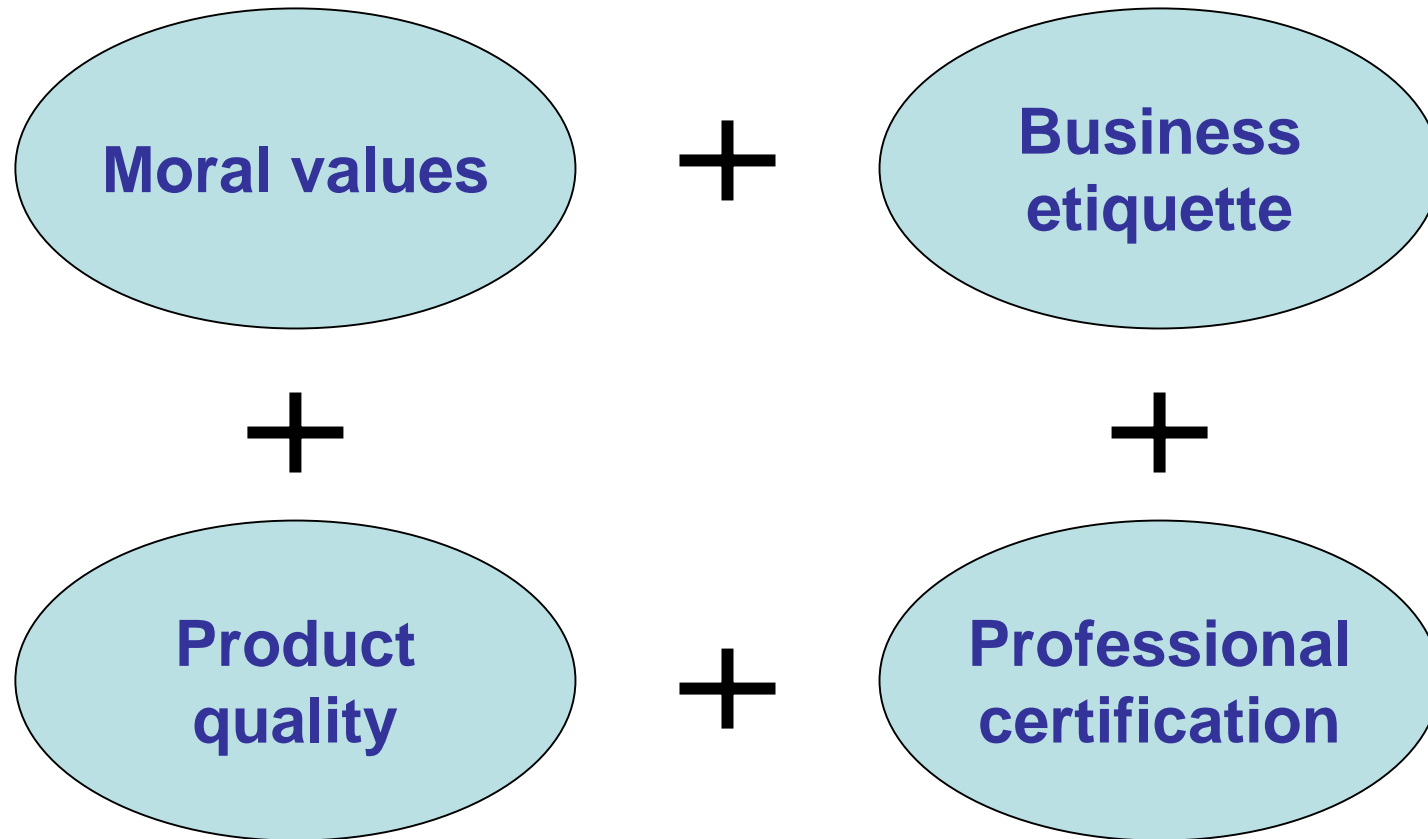
- Engineer as an agent of technical change
- Engineer as a logical thinker free of bias
- Engineer as socially responsible, ensuring the benevolence of technical change.

“Professions are devoted to the service of the public, above and beyond material incentives.” (MS Larson)

## HALLMARKS OF A PROFESSION

- Existence of a professional association
- Advanced training in specialized knowledge
- Established formal qualification and certification
- Existence of a Code of Conduct or Ethics

## THE COMPONENTS OF ETHICS



## PURPOSE OF A CODE OF ETHICS

- Distinguish the engineer from others.
- Assert independence from the business rhetorically, if not in practice.

**Norms of  
service**

**Codes of  
conduct**

**Control of  
behavior**

# ASME CODE OF ETHICS FOR ENGINEERS

## The Fundamental Principles

Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

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

Note that human welfare is listed first.

# ASME CODE OF ETHICS FOR ENGINEERS

## The Fundamental Canons (*Selected*)

1. Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.
2. Engineers shall perform services only in the areas of their competence.
3. Engineers shall continue their professional development throughout their careers and shall provide opportunities for the professional and ethical development of those engineers under their supervision.
8. Engineers shall consider environmental impact in the performance of their professional duties.
9. Engineers shall consider sustainable development in the performance of their professional duties.

“Health,” “safety,” “welfare,” “environment,” “sustainable development” are all part of our ethics.

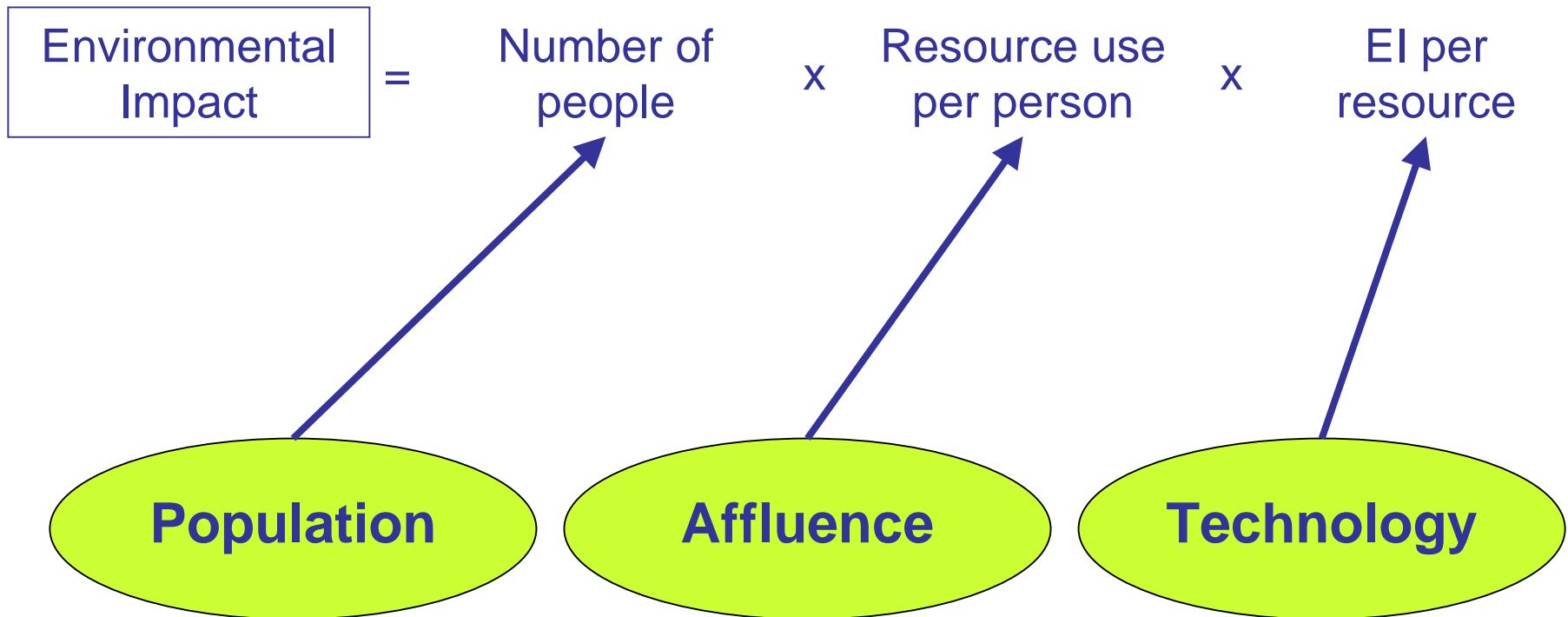
## ETHICS AS A SOCIAL CONTRACT

Are codes of ethics merely “window dressing,” or are do they constitute a social contract between the engineer and society?

Do engineers risk too much in this social contract if they pursue a design philosophy that changes the world view of what constitutes “proper design”?

What does the engineer owe to society, to the environment, to the future?

# THE NEW ENGINEER – AND SOCIAL RESPONSIBILITY



Engineer → Technology → Environmental impact

## TECHNOLOGICAL FIXES – DO THEY REALLY WORK?

Is technology sometimes the cause, or the effect?

Can changes in technology affect environmental impact without there being major changes in societal factors?

A bright yellow oval with a black outline, containing the text "Clean Technology" in a bold, blue, sans-serif font.

**“Clean”  
Technology**

What is the appropriate technology that should be transferred to the Third World?

What is the appropriate technical solution?

Who really “owns” responsibility for the greater good?

## OWNERSHIP

What priority does the environment have in the definition of what constitutes a “good design”?

What motivates and rewards the “new” engineer....industrial values defined by corporations, or the ethics of protecting and conserving resources for future generations?

Do engineers take a systemic, multidisciplinary approach to implementing technical solutions?

“You are the God of your part.”

- *Genichi Taguchi*

What are the consequences of our decisions and actions?

# “MY PERCEPTION IS MY REALITY”



“The earth belongs...to the living...no generation can contract debts greater than may be paid during the course of its own existence.”

-- Thomas Jefferson  
in a letter to James Madison, 1789