

PROFESSIONAL
RESPONSIBILITY
&
PROFESSIONAL
ETHICS



PROFESSIONAL RESPONSIBILITY

- **Engineering profession is a complex subject matter.**
- ▢ **Layman cannot differentiate between competent and incompetent professionals.**



Professionals have special skills:

**where to find a specific
knowledge & examples**

**methodologies, algorithms,
equations**

**and know where, when and
how to apply them.**



A professional differs from a technically competent person in his awareness of the society in which the skills are being used.

Therefore some of the educational background is devoted to cultural awareness.



CERTIFICATION OF COMPETENCE

Chartered Engineer

ABET

ISO 9000

TSE



TRUSTWORTHINESS

**Society must rely on
professionals' awareness of his
role in society and not being
self serving**

**Profession educates its member to
put society & client before self-
interest.**



Compensation (pay, income, profit) is important, but should not be the only driving force.



Professional takes on work primarily for moral satisfaction secondarily for compensation



**A practical way for
professionals to govern
themselves:
an accepted code of ethics:**

- ◆ **reminder of moral standards**
- ◆ **a source of guidance in difficult moral dilemmas**
- ◆ **standard of evaluating cases of alleged misconduct**



NORMS OF CONDUCT needed to regulate relationships between

- ← The engineer and the company**
- ← The engineer and the society**
- ← The engineer and other engineers**
- ← The company and the society**
- ← The company and other companies**
- ← Engineer and the profession**
- ← Company and the profession**



**All are actually based on
the principle of
obligation towards the
society.**



Two basic forms:

→ legislation

→ code of ethics



MORAL DILEMMAS

- We analyze ethical problems, often using our beliefs.**
- Beliefs may be internally inconsistent & contradictory.**
- Different parts of the world have different moral values.**



Must find a way to incorporate moral judgments into a consistent and systematic whole.

Socratic method: analyzing beliefs or opinions for their logical weakness by asking questions (Like American lawyers)



One must be aware of some pitfalls in ethical analysis; principles are usually rather vague:

Often engineers ignore moral dilemmas, and deal with physical problems.

Dilemmas are problems without a unique right solution.

Being sensitive to areas outside technical areas is an obligation.



Some aspects of life an engineer must recognize:

↑ Political implications

↑ problems with no complete solutions

only a minimization of bad solutions



Engineers often work as part of a design team.

Decisions:

↻ affect the whole

↻ are affected by the work of others



Engineers working for a company often face the conflict between

- ↪ loyalty to the society**
- ↪ loyalty to the employer
(company)**
- ↪ loyalty to their conscience**
- ↪ loyalty to the profession**



PRODUCT SAFETY & QUALITY


Engineers must take into account the safety of the user. Manufacturer is responsible even if the product is used in an unintended way




Engineers cannot foresee every circumstance in which a product can be used, but must try to assess how & where it can fail.



Company (not the engineer) is the liable (legally responsible) party:

 **Company is (legally) responsible to the customer,**

 **Engineer is responsible to the company.**



Product quality conflicts

↘ **customers (society's)
satisfaction** ■

↘ **company's profit**



Government's Role:

- ➔ **Standards must be set by a neutral party**
- ➔ **Improvement of standards may be costly and must be compensated for.**



Examples

- **DC-10 incident**
- **Space shuttle disaster**
- **Building at Mithatpasa and Z. Gokalp**



**With new technologies,
engineers can**

**← increase quality, at no
additional cost,**

**← reduce cost, with no
sacrifice from quality.**



Engineers often led the consumer protection efforts.

- **There is a marked increase in the world in terms of product liability legislation.**
- **Companies become more responsible for their products & media stresses that too.**
- **Engineers must design their products to high standards, so that company stays in business.**



Company may be held liable if:

↑ Product is defective

cannot be used for its intended purpose.

↑ Manufacturing process is faulty,

for example testing is not performed properly.

↑ Labeling is inadequate.

(regarding warnings for proper use)



- ↑ **Packaging is not proper, resulting in damage during shipment.**
- ↑ **Records** regarding consumer complaints, sales, manufacturing and distribution **is not maintained properly.**
- ↑ **Quality control & assurance** in all phases of production (from design to distribution) **is important.**



ETHICAL PROBLEMS

Trying to decrease cost may create some ethical problems for the engineer.

 **quality and consumer safety on one side**

 **company profits & job security on the other.**



DILEMMA

**arises when superiors request you
not to pay much attention to
obligations toward the customer.
If you insist on what you think is
right,
and let your opinion be known
outside the company,
you may loose your job
.....to no benefit to society.**



NSPE says:

- ➔ **Do everything possible within the company, to correct the wrong action.**
- ➔ **If it does not work notify the customer (or the public),**
- ➔ **but let the company know of your intentions.**

(This is not to be considered as a threat. It should not be bluffing either.)



**Fight for your rights;
otherwise you loose
your honor and
dignity together with
your rights.**



Case studies

Please read

- **Being right is expensive (p.96)**
- **Holding the line (p.98)**



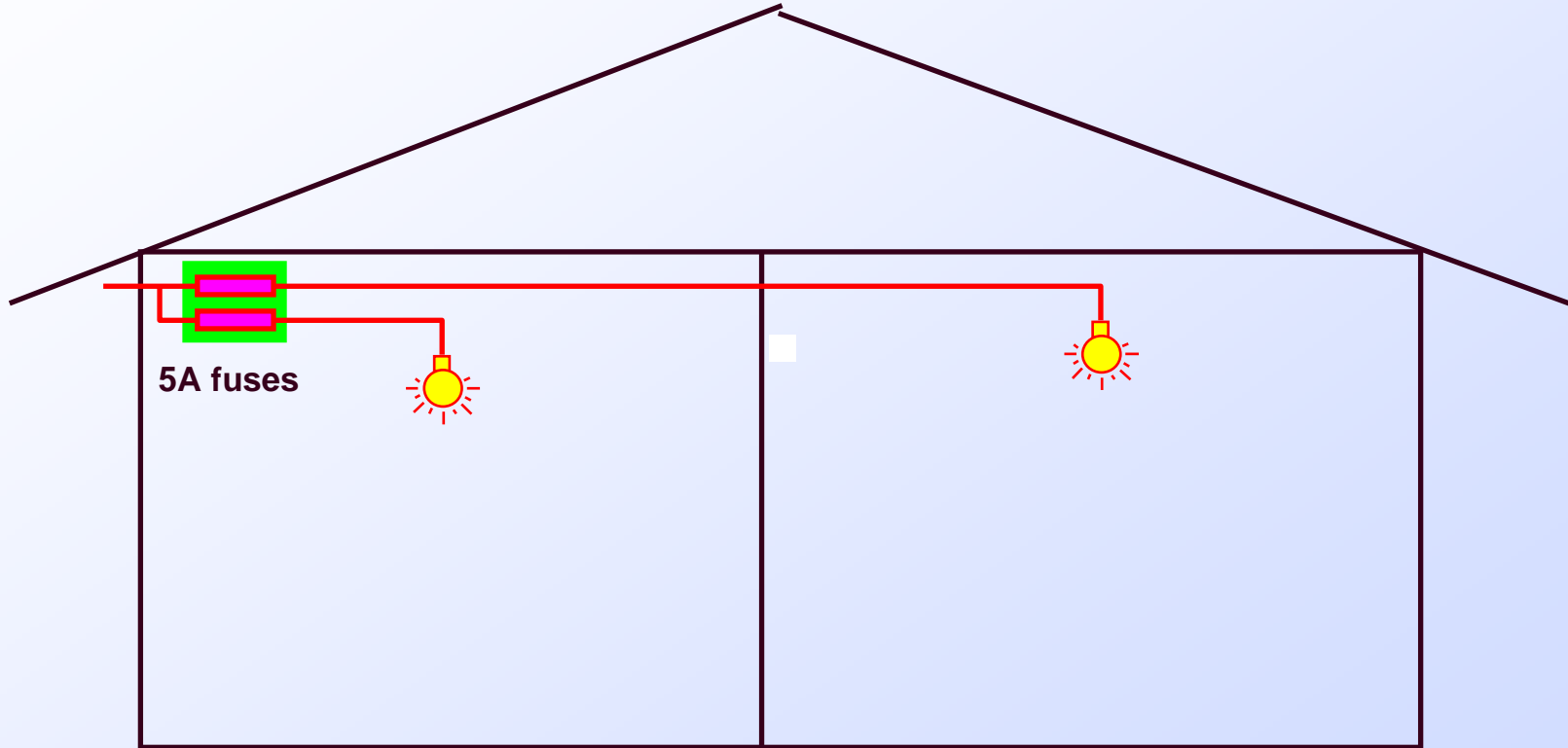
DESIGN CHANGES

**Often changes are made in
the execution of design.**

**You must make sure that
changes do not affect
product integrity**

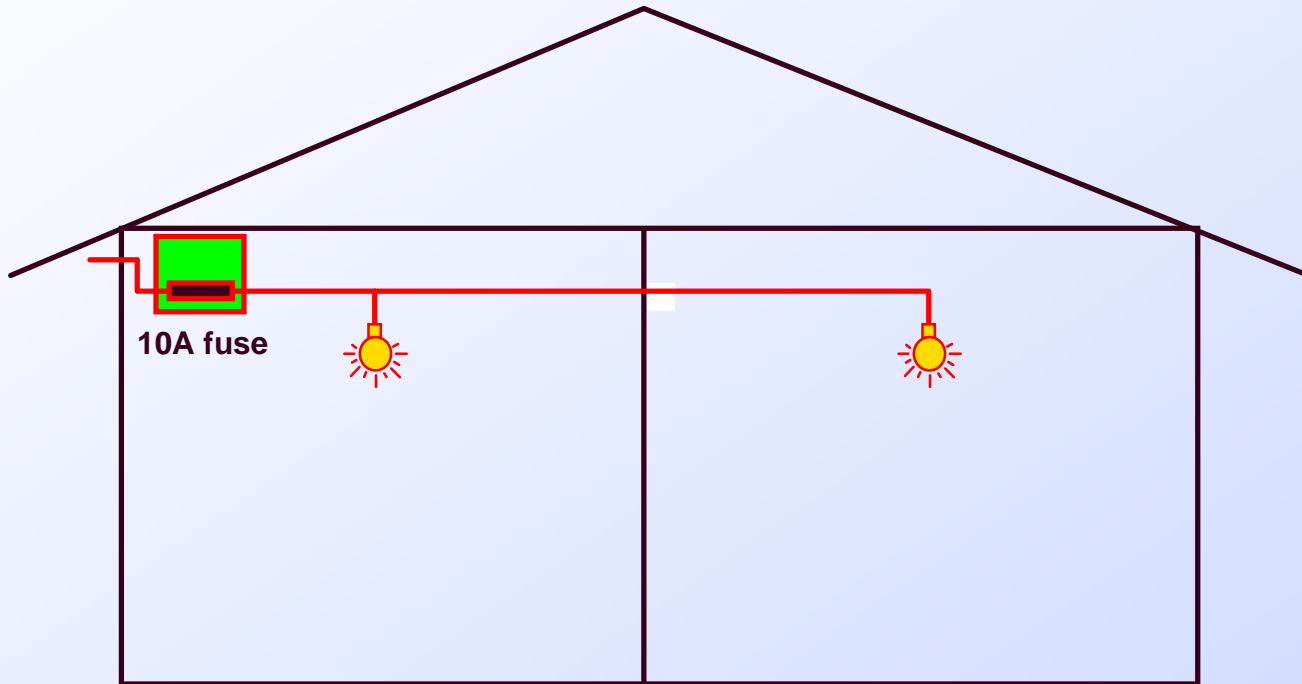


Original design






Modified production





Note that:

 **One 10A fuse instead of two 5A fuses is a deterioration in safety.**

 **First portion of the cable carries twice the current.**



Sometimes a design may fail in spite of engineers' best efforts,

because existing state of the technology is not enough.

Therefore, a continuing effort towards the advancement of technology is necessary.

Safety margins must be observed (increasing the cost!)



Kobe earthquake

↑ **The construction technologies which proved to be satisfactory so far, were not good enough in this case.**

↑ **Will be analyzed and precautions will be taken and technology will be improved.**



Tacoma bridge disaster

- ↑ **Strong winds cause vibrations on the bridge.**
- ↑ **At 42 mph. oscillation frequencies coincide with the resonance frequency of the bridge,**
- ↑ **oscillation magnitude increases and the bridge collapses.**

CODE OF ETHICS



CODE OF ETHICS

Rules of practice

- In the performance of professional duties, **safety, health and welfare of public comes first.**
- Perform services only in your area of competence.**



CODE OF ETHICS

Rules of practice (cont'd)

- While making public statements, be **objective & truthful.**
- When you act for an employer or customer, be **faithful.**
- Don't try to get professional employment in **improper ways.**



CODE OF ETHICS

Professional obligations

**Always be guided by the
highest standards of integrity.**



Professional obligations (Cont'd)

Always try to serve the **public interest.**



Professional obligations (Cont'd)

Always try to avoid doing things that may discredit the profession or deceive the public.



Professional obligations (Cont'd)

Do not disclose business secrets of present or past employers or clients without expressed consent.



Professional obligations (Cont'd)

**Don't be influenced by
conflicts of interest.**



Professional obligations (Cont'd)

Only appropriate and adequate compensation for performing professional duties.



Professional obligations (Cont'd)

**Don't compete with other
engineers or companies
using questionable or **unfair**
methods.**



Professional obligations (Cont'd)

**Take the professional
responsibility for all your
professional actions.**



Professional obligations (Cont'd)

Don't attempt to hurt the reputation of other engineers or criticize their work without proper evidence.



Professional obligations (Cont'd)

**If such evidence of unethical
or illegal conduct exists
present it to the **proper
authority** for action.**



Professional obligations (Cont'd)

**Give credit for engineering work
only to whom it belongs and
recognize proprietary interests.**



Professional obligations (Cont'd)

Cooperate in extending the effectiveness of the profession by interchanging ideas, information and experience with others and provide opportunity for professional development of engineers under your supervision.



HOMework:

(Due next meeting)

Read “NSPE Code of Ethics for Engineers” (Appendix one) and write each (numbered) item in one sentence, in your own words

