Ethics & Documentation in Engineering Writing

Wherever you find technology, you find ethical and moral concerns.

- Where to dump the hazardous waste.
- What to with the asbestos insulation
- Where to locate the high-power transmission lines and telecom base-stations.

Ethics & Documentation in Engineering Writing

While working with other people, you may also at times be confronted with issues of:

- Accurate record keeping
- Alcohol abuse
- Dishonesty
- Discrimination

Five Communication Concerns

• This section focuses on five concerns you must be aware of as an engineering writer and researcher.

• Some of these concerns are actually illegal practices engineers sometimes commit either knowingly or unknowingly.

• In some instances they have paid heavy prices for their actions, such as lawsuits, job loss, or at least a diminished reputation.

Five Communication Concerns

- Copyright infringement

- Tampering with results

- Withholding adverse information

- Writing unclear instructions

- Omitting safety warnings

Five Communication Concerns

Copyright infringement:

• Just because an image or article is available in print or on the Internet does not mean that anyone has a right to copy and use it.

• If you come up with original ideas or inventions as a result of your own research, copyright them so that they are protected under law.

Five Communication Concerns

Copyright infringement:

• Once you have copyrighted your work, it cannot be used or distributed without your permission.

• If someone does so, they have infringed on your copyright and you may be able to sue them..

Five Communication Concerns

Copyright infringement:

•   For the engineering researcher and writer, the important point is always to be aware of someone else's intellectual property and to never use it or cite it in any way without permission or acknowledgment.

•   The exception to this is when you quote or paraphrase a small amount of copyrighted work for educational purposes, as long as you give credit to the source and gain no financial profit from your use of the work

Five Communication Concerns

Tampering with results:

•   Engineers often have to write up the results of their research and experimentation. What if the numbers don't quite come out the way they were supposed to?

•   For example, your team is working on a suspension bridge and has run into a small problem toward the end of construction.

Five Communication Concerns

Tampering with results:

- The team decides the problem can be overlooked if a few measurements are changed to meet requirements.

- In your final report, would you carefully change a few numbers so that things ''come out right''?

Five Communication Concerns

Tampering with results:

• Confronted with such issues, an ethical engineer wouldn't change any results and would work until the problems had been solved and everything was accurate.

• Sometimes it might seem a few changed details won't hurt, but tampering with results is a very serious issue in the engineering field and is a choice that sooner or later can come back to haunt you

Five Communication Concerns

Tampering with results:

• Another form of tampering with results is found in concocting data. Here a writer makes up information or results with no backing or truth behind them—they are fictitious.

• Unethical engineers have been known to insert concocted data in reports to show progress or results that are nonexistent, often in order to get further funding or to hide a lack of real effort.

• Again, time and suspicion have a way of uncovering such actions.

Five Communication Concerns

Withholding adverse information:

• Plenty of engineering evidence shows that withholding adverse information can lead to problems, accidents, and even deaths. If any kind of damage results because you withhold information about a flawed design, a dangerous product, or a means to avoid harm, it is your or your company's responsibility.

Five Communication Concerns

Withholding adverse information:

• You can certainly be held liable for your inaction. No ethical engineer should keep silent or fail to include in a written report anything concerning a product or process that might result in a user's financial loss, physical harm, or death

Five Communication Concerns

Writing unclear instructions:

• In your engineering career, you may get involved in writing instructions, procedures, manuals, or user guides at some point. These must be written in a detailed and precise manner, without error or ambiguity.

Five Communication Concerns

Writing unclear instructions:

• Imagine the results of unclear instructions for operating an aircraft, space shuttle, or nuclear reactor.

• Imagine the results of ambiguity about assembling or operating everyday products—such as computers, cameras, pumps, or telescopes: anger and a diminished respect for the product and the company that produced it.

Five Communication Concerns

Omitting safety warnings:

•	Engineers should constantly be concerned with the safety of their customers and of anyone else their products and designs might affect.

•	This means you must include clear safety warnings in any design, procedure, or product that requires them.

Five Communication Concerns

Omitting safety warnings:

• You are always responsible for providing information for consumer's safety. Failure to provide adequate safety warnings can lead to loss, disaster, serious physical harm, or even death.

• Always take great care to provide clear safety warnings whenever necessary in your writing—and ensure they are visually prominent and accessible to your reader.

Tools for Ethical Decision Making

- Faced with any of the above problems, you can use some tools to justify doing the right thing.

- Some of the most powerful are the Codes of Ethics published by professional engineering associations and by some of the larger engineering firms.

- You can find many of them online by entering ''code of ethics of engineers''.

Tools for Ethical Decision Making

Accreditation Board for Engineering and Technology

CODE OF ETHICS OF 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;

III. striving to increase the competence and prestige of the engineering profession; and

IV. supporting the professional and technical societies of their disciplines.

THE FUNDAMENTAL CANONS

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 issue public statements only in an objective and truthful manner.

4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.

5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.

6. Engineers shall act in such a manner as to uphold and enhance the honor, integrity, and dignity of the profession.

7. Engineers shall continue their professional development throughout their careers and shall provide opportunities for the professional development of those engineers under their supervision.

ABET

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Figure 11-1 A typical code of ethics for the engineering profession. Use documents like this to support your position when faced with an ethical choice of action.

Tools for Ethical Decision Making

☐ What caused this dilemma in the first place?

☐ Have I clearly defined the dilemma and its possible options?

☐ Should others be involved in any final decision?

☐ What are the immediate or long-term results of each option likely to be?

☐ Could any option injure anyone (a) physically (b) emotionally (c) professionally?

☐ Are all my options legal?

☐ To what extent does each option follow the golden rule?

☐ Will my decision be one I would willingly share with my

    ☐ management?

    ☐ colleagues?

    ☐ family?

    ☐ lawyer?

    ☐ local news media?

    ☐ religious leader?

☐ Whatever option I choose, could there ever be exceptions to it?

Figure 11-3   Checklist for ethical decision making.

Ethics of Honest Research

- Common knowledge:

- Plagiarism

- Copyright infringement

- Permissions

Ethics of Honest Research

Common knowledge:

• it's usually considered to be any fact, date, event, information, circuit, or equation that can easily be looked up in a standard reference book.

Ethics of Honest Research

Plagiarism

- A common kind of theft among students in high school and college is plagiarism.

- This kind of dishonesty is not limited to youth or the academic world.

Ethics of Honest Research

Plagiarism

• If as an engineer you knowingly or unknowingly ''borrow'' the language, ideas, or graphics of others, representing them as your own original work by failing to acknowledge your sources, you are plagiarizing—a very serious offense.

• You might even be infringing on someone's copyright, and thus could open yourself up to lawsuits

Ethics of Honest Research

- Copyright infringement

- Permissions

Citing Information

Document your information borrowings in order to:

- Protect the originator, the author of the information.

- Protect yourself from accusations of plagiarism.

- Demonstrate to readers that you are aware of the latest developments.

- Enable readers to read the information for themselves.

Citation Examples

At end of a sentence:

```
This section borrows information from
the first source  [1].
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Indicating page numbers:

```
This section borrows from specific page
numbers of the fourth source [4, pp. 3–
6].
This section borrows from a specific
page [79] from the fourth source [4].
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Including quotations:

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This section "quotes from a source" [8,
p. 23].
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Textual Citations and References Page

In order to reform fuel (change it into its useful form so it can react to create energy), the system has to be heated to a certain temperature in order for the reaction to occur [10]. Thus, long start-up times are also holding fuel cells back from use in HEVs, yet although there are still considerable strides to be taken in fuel cell technology, these cells will definitely serve as a viable option for HEVs in the future [1].

REFERENCES

[1] C.H. Roth, *Fundamentals of Logic Design, 5th ed. St. Paul: West Publishing Company,* 2003.

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[10] Email from Mark A. Carpenter, A98-b2 project manager, AMD, Austin, Texas, March 8, 2008.