



Online Ethics Center  
FOR ENGINEERING AND SCIENCE

# Use of CD-ROM for Highway Design -- NSPE Case No. 98-3

## Year

1998

## Description

A chemical engineer thinks about offering services in facilities design and construction, which he would perform with the help of a computer program.

## Body

### Facts

Engineer A, a chemical engineer with no facilities design and construction experience, receives a solicitation in the mail with the following information:

"Engineers today cannot afford to pass up a single job that comes by - including construction projects that may be new or unfamiliar.

Now - thanks to a revolutionary new CD-ROM - specifying, designing and costing out any construction project is as easy as pointing and clicking your mouse - no matter your design experience. For instance, never designed a highway before? No problem. Just point to the 'Highways' window and click.

Simply sign and return this letter today and you'll be among the first engineers to see how this full-featured interactive library of standard design can help you work

faster than ever and increase your firm's profits."

Engineer A orders the CD-ROM and begins to offer facilities design and construction services.

## Question

- Was it ethical for Engineer A to offer facilities design and construction services under the facts presented?

## References

- *Code of Ethics* - Section II.2. - "Engineers shall perform services only in the areas of their competence."
- Section II.2.a. - "Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved."
- Section II.2.b. - "Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which they lack competence, nor to any plan or document not prepared under their direction and control."
- Section II.2.c. - "Engineers may accept assignments and assume responsibility for coordination of an entire project and sign and seal the engineering documents for the entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment."
- Section III.2.b. - "Engineers shall not complete, sign or seal plans and/or specifications that are not in conformity with applicable engineering standards. If the client or employer insists on such unprofessional conduct, they shall notify the proper authorities and withdraw from further service on the project."

## Discussion

The issue of whether an engineer possesses the appropriate level of competence to perform specified services is one of most basic professional and ethical issues faced by practitioners (See Code Section II.2.a.). NSPE has been supportive of the concept that a qualified individual engineer, regardless of his or her particular area of

technical discipline, should be licensed as a "professional engineer". However, this position should not be understood to suggest that all engineers are free to practice without restriction in any and all areas within the practice of engineering. Instead, all engineers are implored to exercise careful professional judgment and discretion and practice solely within his or her area(s) of competency.

Over the years, the Board of Ethical Review has examined the issue of professional competency on numerous occasions under a variety of factual situations. For example, in Case 94-8, Engineer A, a professional engineer, worked with a construction contractor on a design/build project for the construction of an industrial facility. During the construction of the project, the construction contractor separately retained the services of Engineer B, a professional engineer to design structural footings as part of the facility. Engineer B's degree and background was in chemical engineering. Engineer A had been unable to establish that Engineer B had any apparent subsequent training in foundation design, and Engineer A had reservations concerning the competence of Engineer B to design the structural footings and reported his concerns to the contractor. The Board decided that it would be unethical for Engineer B to perform the design of the structural footings as part of the facility and that Engineer A had an ethical responsibility to question Engineer B's competency and report his concerns to the contractor.

In BER Case 71-2, a case involving the brokerage of engineering services by two firms competing for government work and the question of professional competence, the Board recognized "the propriety and value of the prime professional or client retaining the services of experts and specialists in the interests of the project" and noted that a prime professional will be expected to retain or recommend the retention of experts and specialists in situations in which the prime professional is performing substantial services on the project. Likewise, BER Case 78-5 involved an effort by a consulting firm under consideration to perform services to a public utility, in which the firm sought to alter its qualifications following its interview with the public utility in order to improve its position to secure the contract. The Board affirmed its decision rendered in BER Case 71-2 that in the field of consulting practice, engineers have an ethical obligation to seek work only in areas where they possess educational background and experience or to retain individuals who possess the necessary educational background and experience to perform the work.

It is clear that Engineer A, a chemical engineer, has no apparent substantive background or experience in the area of facilities design and construction. A CD-

ROM that permits virtually anyone to "specify, design and cost out" a project clearly is not an appropriate basis upon which an individual can obtain professional competency to perform facilities design and construction services. An individual seeking to obtain an acceptable level of competency in the basic elements of facilities design and construction (e.g., civil, structural, mechanical, electrical engineering) should seek and be able to demonstrate appropriate engineering and related education and experience). Relying on a "how to" CD-ROM appears to show a general disregard for the fundamental role that professional engineers play in protecting the public health and safety and minimizes the high level of knowledge and expertise necessary to perform these critical responsibilities. Professional engineering cannot be reduced to an activity whereby practitioners rely upon computers and technical information instead of time-tested professional experience and engineering judgment.

In a sense, the direct mail product described under the facts is not unlike mail order certifications offered by so called "diploma mills" whereby individuals "self certify" their competency based upon a perfunctory review process that rarely involves comprehensive study, examination, or practice. By ordering and using the CD-ROM, Engineer A in a sense was "self-certifying" his competency to perform facilities design and construction services without obtaining the substantive education, experience, and qualifications to perform those services in a competent and professional manner. The Board considers such activities completely contrary to the basic ethical principles established in the Code of Ethics.

In closing, the Board's decision should not be understood as a wholesale rejection of the use of computers, CD-ROMs and other technological advances. Rather, it is the Board's position that technology has an important place in the practice of engineering, but it must never be a replacement of a substitute for engineering judgment.

## **Conclusion**

It was not ethical for Engineer A to offer facilities design and construction services under the facts presented.

**Board of Ethical Review:**

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- James G. Fuller, P.E.
- Donald L. Hiatte, P.E.
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[NSPE Code of Ethics](#) An earlier version may have been used in this case.

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For a version of this case adapted for classroom use, see: [Use of CD-ROM for Highway Design \(adapted from NSPE Case No. 98-3\)](#).

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**Resource Type**

Case Study / Scenario

**Parent Collection**

Cases from the NSPE Board of Ethical Review

**Discipline(s)**

Engineering

Authoring Institution

National Society of Professional Engineers (NSPE)