BER Case 90-6

APPROVED BY BER
November 9, 1990

Section II.2.a. - Code of Ethics
Section II.2.b. - Code of Ethics
Section II.2.c. - Code of Ethics

USE OF CADD SYSTEM

FACTS:

1. Engineer A, a registered professional engineer signs and seals documents he prepared using a CADD system.

2. Engineer B, a registered professional engineer signs and seals documents which are the results of the efforts of others using a CADD system working under Engineer B's direction and control.

QUESTIONS:

1. Was it ethical for Engineer A, a registered professional engineer to sign and seal documents he prepared using a CADD system?

2. Was it ethical for Engineer B, a registered professional engineer, to sign and seal documents which are the work of others using a CADD system, working under his direction and control?

REFERENCES:

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.

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DISCUSSION:

In recent years, the engineering profession has been "revolutionized" by exponential growth in new and innovative computer technological breakthroughs. None have been more dynamic than the evolution that transformed yesterday's manual design techniques to Computer Aided Design (CAD), thence to Computer Assisted Drafting and Design (CADD) and soon Artificial Intelligence (AE). The BER considers the change to CAD to merely represent a drafting enhancement. The change to CADD provides the BER with concerns that require assurance that the professional engineer has the requisite background, education and training to be proficient with the dynamics of CADD including the limitations of current technology . As night follows day one can be assured that CADD utilized beyond its ability to serve as a valuable tool has a propensity to be utilized as a crutch or substitute for judgement. That translates to a scenario for potential liability.

Certainly this point must be heeded in the parallel area of professionalism and ethics. It is critical for engineers to fully understand the role that new technologies such as CADD will play in the performance of professional services.

The Code clearly indicates that engineers must not "affix their signatures to any plans or documents dealing with subject matter which they lack competence, nor to any plan or document not prepared under their direction and control." This language in the Code articulates an important point with respect to the use of CADD and similar systems in the development of documents and plans for the design of facilities and other projects. The key point is that the engineer must utilize such systems to assist the engineer in the performance of professional services and not employ such systems as a replacement for professional competence and expertise. In some instances, there may be a temptation for the engineer to incorporate a solution provided by the system which the engineer has neither prepared nor fully understands because the engineer believes, based upon engineer's confidence in the system and upon prior experience, that the system will provide a quality solution on a project.

This case is the first one in which this Board has had the opportunity to review facts involving the use of computerized design. However, from time to time this Board has had an opportunity to review cases addressing similar issues. One good example was BER Case 86-2, in which the chief engineer within a large engineering firm affixed his seal to some of the plans prepared by registered engineers working under his general direction who did not affix their seals to the plans. At times the engineer also sealed plans prepared by non-registered graduate engineers under his general supervision. Because of the size of the organization and the large number of projects being designed at any one time, the engineer found it impossible to give a detailed review or check of the design. He believed that he was ethically and legally correct in not doing so because of his confidence in the ability of those he had hired and who were working under his general direction and supervision. By general direction and supervision, the Engineer meant that he was involved in helping to establish the concept, the design requirements, and the review elements of the design or project status as the design progressed.

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He was consulted about technical questions and provided answers and direction in these matters. In deciding that it was unethical for him to seal plans that had not been prepared by him, or which he had not checked and reviewed in detail, the Board read the language in Section II.2.b. quite literally. We concluded, based upon a review of authoritative sources that the terms "direction" and "control" have a meaning which, when combined, would suggest that an engineer would be required to perform all tasks related to the preparation of the drawings, plans, and specifications in order for the engineer to ethically affix his seal.

The rendering of the Board's opinion in BER Case 86-2, raised a considerable degree of discussion within the engineering community because to many it appeared to be inconsistent with customary and generally prevailing practices within the engineering profession and would therefore place a significant number of practitioners in conflict with the provisions of the Code.

This Board has long noted that the Code of Ethics is not a static document and must reflect and be in consonance with generally prevailing practices within the engineering profession. The Code must not impose an impossible or idealistic standard upon engineers, but rather must establish a bench mark of reasonable and rational methods of practice for it to maintain its credibility and adherence. For that reason, we think the Board's conclusion in BER Case 86-2 should be modified to reflect actual practices which exist within engineering and not impose a impossible standard upon practice. Were we to decide BER Case 86-2 today, we would conclude that the it was not unethical for the engineer in that instance to seal plans that were not personally prepared by him as long as those plans were checked and reviewed by the engineer in some detail. We do not believe this represents a reversal of the Board's decision in BER Case 86-2, but rather a clarification, particularly for those who were troubled by the Board's discussion and conclusion in that case.

Turning to the circumstances of the two instant questions, based upon our discussion clarifying BER Case 86-2, we believe logic would dictate that in either case it would not be unethical for an engineer to sign and seal the drawings in question as long as those plans were checked and reviewed by the engineer in some detail. In either case, we are not of the view that an engineer must personally prepare the drawings, plans and other documents involved. The key requirement is that an engineer possesses sufficient competence, assumes full responsibility for the work product and carefully directs, controls and reviews the material prepared under the engineer's responsible charge. We believe this approach is consistent with the language contained in the Code.

CONCLUSION:

1. It was ethical for Engineer A, a registered professional engineer to sign and seal documents he prepared using a CADD system.

2. It was ethical for Engineer B, a registered professional engineer, to sign and seal documents which are the work of others using a CADD system working under his direction and control.

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