

Shifting the Emphasis in Engineering Education

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Melvin Webber related a case of an elaborate public transit system that was designed for a city in southeast Asia. He cited the large number of studies and design reports prepared for this project and then indicated that the fare on this technically excellent system would be nearly equal to the daily wage of a typical worker.

We are concerned about the relation of engineering education to the institutional and cultural barriers that seem to inhibit a real consideration by engineers of nonfacility solutions to public problems. The public image of the engineer is that of a builder. Young people enter engineering colleges at least partly because they want to grapple with problems in the physical world in a satisfyingly visible way.

Until comparatively recently, there was honor enough in being a builder. But highway engineers, for example, are aware that they are now suspected by some of a single-minded desire to pave over America. Most civil engineers would agree that nothing in their educational experiences ran counter to the notion that the only function of the engineer is to create more and more physical property. Writers who picture the "engineering mind" as bent on constant rearrangement of the landscape may thus have a point.

We think that engineering educators should take the lead in bringing to their students and to the public as well a new concept of the engineer: not merely one who builds but one who is a steward of the physical environment and who knows when to build and when to try other solutions in which he may play only a part along with other professionals. It is not sufficient simply to expose engineering students to courses in social science. We must in our professional courses try to help students relate their technical knowledge to larger social and political realities. In an earlier day, engineers might be sure they were contributing to social welfare by building a railroad. Today they could not be nearly so certain that they were creating a net social benefit.

The institutional barriers to which we have referred stem from the traditional concept of the function of an engineer. For example, in most cases the engineer is paid for what he or she builds and is, therefore, biased against offering professional advice that does not culminate in a construction project. Anyone who has worked as a consulting engineer knows that clients do not often willingly pay the true cost of a study or report. There is a tendency for consultants to lose money on such work with the hope of recouping their losses by preparing project plans. We suspect that situations of this kind have influenced the decision to proceed with more than one marginal public project.