

The Challenge of Design

Each year I have the opportunity to talk with many graduating chemical engineers about their ambitions and career interests. As our company is a large one, we interview students from all sections of the country and at all degree levels. I am thoroughly impressed with the quality of the young engineers that our schools are turning out and I am confident that the future of our profession rests in competent, skilled hands.

There is one thing that disturbs me about the viewpoint of many graduates, particularly the Ph.D.'s, with whom I discuss engineering in industry. It is their apparent complete lack of interest in design work. They look upon design as something routine and unchallenging, to be done by technicians rather than by professionals. Perhaps as many as half have acquired the viewpoint that technical challenge and stimulation are to be found only in analysis work. By analysis I mean the formulation of mathematical models either to fit research results to usually fairly well-known theoretical relationships or to optimize and improve control of existing processes.

I should like to make it clear that I have nothing but enthusiasm for the great strides that our profession has made in work of this kind in recent years. But I think that there are two important points about design work that our schools are failing to emphasize as much as they should. The first is that design offers the individual more opportunity to use his imagination and creativity than any other phase of engineering. In design, the engineer starts only with a need for a plant or a product and he has great latitude in how he chooses to build his process. Design is the essence of creativity and therefore of engineering, and an improperly designed plant will never perform well regardless of how carefully it is modeled and optimized after construction.

The second point is that almost none of our graduates associate design projects with the type of analysis work that they have acquired such a great interest in. In my company, as well as in many others, we find that our engineers are recognizing more and more the importance of building mathematical models of our new processes as an integral part of the design procedure. Analog and digital computer simulations of many of our newer plants and their associated control systems have become almost commonplace, not only for design purposes but also to pretune instruments and to help in training operating personnel.

The loss of status of design work as a challenging endeavor in the eyes of our new generation of engineers is due partly to an increasing loss of contact of our college faculties with the needs and practices of industry. If our most able graduates are rejecting design work from an informed judgment of what it has to offer, this is one thing. But my own observation is that this is not the case. I should like to see our industry-faculty relationships grow closer than they have been during recent years. Our faculty members need to spend some time in industrial environments removed from their major areas of research if they are to fulfill their role as teachers and are to advise their students on engineering careers. Industry as well must do its part by publishing and publicizing its work, by showing greater interest and participation in the educational process, and by offering our faculty members and student groups every available opportunity to learn more of our industrial problems and needs.

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