# The Role of the Engineering-Contractor in Design of Food Processing Plants for Sanitation and Good Housekeeping

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WOULD ANY of us buy food for our families that we knew was manufactured in an unsanitary manner or in a factory that permitted unsightly conditions and poor housekeeping? Of course we would not. Neither would our grandparents or parents. Yet today the standards of 40, 20, 10, or even 5 years ago would likely be considered as inadequate. New scientific developments will make present sanitation and housekeeping standards obsolete at an even faster pace than in the past.

The increasing emphasis on stricter and higher standards of sanitation and housekeeping is common to all phases of the food industry including oilseeds milling and extraction, vegetable oil processing, meat packing, wet and dry corn milling. Successful food processors are well aware of the changing and more inclusive standards demanded by the American people. Consequently they maintain active functioning sanitation and housekeeping programs that must be integrated with operations at all times to be effective. Food processors know that these programs must prevent trouble before it begins. In our present competitive markets we can not afford corrective type investigations because then good will and business can be lost—perhaps permanently. Food processors can expect more frequent visits and sample analyses by FDA inspectors in the future. Everyone knows the adverse effect that can be caused to a food business if an uncomplimentary FDA report is leaked to the public accidentally. For the food processor it is not only good business; it is essential for staying in business that he maintain his entire food processing plant free of rodents, insects, birds, and other unsightly and unsanitary conditions. Therefore preventive sanitation and housekeeping programs should be executed as an insurance against customer complaints, product losses, and financial losses. Sanitation and housekeeping programs should be executed on a long-term basis and should be effective all the time.

It sounds like an expensive and complex business to establish and maintain a preventive sanitation and housekeeping program. Well, it is. However, no food processor can afford to be without a program, nor can he afford always to be using corrective measures unless he is willing to risk allowing business to go to competition by default. Thus the food processor must have the same ultimate aim as his clients, the American consumer, toward improved sanitation and housekeeping as a measure of insuring the health of our familiies.

With many operating burdens and with increased pressure to place new food products on the market at a fast pace, the food processor often finds that his sanitary and housekeeping experts as well as his other engineers are fully employed with current problems. Urgent new problems resulting from extensive plant modernization, a new food plant, or studies related to new and improved processes can then best be solved by assigning them to an experienced engineering-contractor. Only a few of the food processor's sanitary experts and other engineers will then be needed to be assigned to the project to act in an advisory and liaison capacity. Naturally the engineering-contractor will have the same ultimate aim toward improved sanitation and housekeeping, and integration of sanitation with operations, as the food processor. The experienced engineering-contractor's broad knowledge of the food and other industries, when coupled with the specialized know-how of the food processor, can prove a very effective means for providing advanced designs suitable for future precautionary sanitation and housekeeping programs.

Preventive sanitation and housekeeping programs are so closely related to process design and other engineering functions that the same decisions apply in both cases for starting an engineering-contractor on a new project. It is desirable to start the engineering-contractor before the development program is completed in order to develop and plan a preventive sanitation and housekeeping program on a long-term and prudent cost-conscious basis. Usually there is need for secrecy on a new process in order to protect the business interests of the food processor. Much of the work of the engineering-contractor is based upon processes and operations which involve secret data developed by or known only to his clients. With respect to such information, the engineering-contractor considers himself duty bound not to reveal it to others, and by appropriate contractual provisions will agree to use this confidential data only for his client's benefit. The employees of an engineering-contractor should also be bound to the confidential agreement by individual agreements in regard to such matters. With this type of ethical agreement the engineering-contractor can effectively serve the food processor before the process and architectural design standards are frozen and before major capital expenditures have been committed.

Salaries and fees are of secondary importance in the selection of an engineering-contractor. Good engineering often saves many times its cost through proper design which in turn leads to economical construction. Since the engineering-contractor will have a major role in the design of facilities for a precautionary sanitation and housekeeping program, the food processor should make the selection on the basis of sound technical and cost background together with broad qualifying experience. If a standard plant is being considered for which specialized know-how is offered, a qualified engineering-contractor with this know-how will naturally be considered; but several of the other attributes described later are also desirable for top-notch long-range planning.

For the non-standard plant or new process, the selection becomes more difficult. What other attributes of the engineering contractor must be considered in order to provide the food processor with proper assurance of advanced design know-how in combination with prudent business judgment? An engineering-contractor for a food processing plant should be selected, if possible, with the following qualifications:

- Diversified experience in United States food industry.
- Broad experience in foreign food industry.
- Familiarity with waste disposal techniques.
- Skill in designing new equipment.
- Broad experience in several chemical industries.
- Experience in atomic energy and missile fields.
- Architectural background in preventive sanitation and housekeeping programs.
- Experience in using coordinated modeling techniques.
- Ability to provide comprehensive over-all service with effective cost control.
- Good safety record.

Why are all of these qualifications desirable? To be most effective in designing plants with preventive sanitation and housekeeping programs, the engineering-contractor must be able to anticipate future requirements, build plants that can incorporate new techniques later at low cost, and get maximum value for every dollar of his client's money that he spends.

Experience in several phases of the United States and foreign food industries and familiarity with waste disposal

techniques are fundamental requirements for the engineering-contractor serving that industry. We have organizations such as the American Oil Chemists' Society in this country because we recognize the desirability of diversifying our experience by the exchange of non-confidential information. Some American food processors have acquired European firms mainly to obtain their know-how. Waste-disposal problems are closely related to, if not an actual part of, sanitation programs and we all know that stricter legislation is pending on waste disposal. Therefore this fundamental experience is essential for the engineering-contractor to cope with the rapidly changing technology of the food industry.

Experience in designing new equipment and modifying the design of standard equipment for the chemical, atomic energy, and missile industries as well as the food industry is desirable for the engineering-contractor so that he will have the aptitude to utilize the advanced technology offered by these fields. All too often impressions and established customs are being submitted as matters of fact in a single industry without being subjected to critical evaluation. We are all familiar with practices that are accepted today but were prohibited not long ago such as cleaning-in-place systems, continuous pasteurization, paper containers, etc. Often the trends toward these changing standards that will ultimately effect all segments of the food industry are apparent earlier in these other industries. An engineering-contractor, as an outside observer, who has had intimate contact with many phases of these industries can contribute significantly by introducing advanced process and building designs. To be most effective in this respect the engineering-contractor requires the close cooperation and collaboration of the bacteriologists, engineers, operators, and management of the food company he is serving.

In order to provide effectively and economically for preventive sanitation and housekeeping programs, an engineering-contractor should be well versed in designing and specifying buildings and structures for that purpose. Some typical examples of such design are filling the angles and ledges to a peak with concrete to minimize flat surfaces and thereby reduce dust build-up, installing tile floors and walls, and keeping small process items off the floor by supporting them from columns. This type of design is wonderful but it costs extra money. The engineering-contractor together with the food processor should weigh the value of each of these features separately against their extra cost.

The use of three-dimensional models as a tool in piping, layout, and architectural work has proved very effective when used properly. This tool can likewise prove effective in design for precautionary sanitation and housekeeping programs. Proper use of modeling requires the organized efforts of a complete engineering, procurement, and construction department that are trained as a coordinated team. This teamwork does not occur spontaneously but results from a lot of trial-and-error efforts of engineers who have spent many years of effort in working out the complex problems that occur during the engineering and construction of numerous food and chemical plants. No one should expect to realize similar efficiency in the use of models with less than several years of continuous teamwork.

When used properly as a coordinated effort, modeling can offer these advantages: (1) It permits higher quality engineering. In addition to more effective liaison by the engineering-contractor, it permits the food processor's engineers, operators, and sanitary experts to review details quickly and efficiently. Sanitary and other piping can be run in the most desirable manner. Ductwork and spouting can be located better. Cleanouts and maintenance can be planned more effectively. Attachments for hydraulic jet cleaners and vacuum cleaners can be located in more useful positions. Also, provisions can be made more readily for future sanitary measures. (2) It permits more efficient construction at lower cost. With the use of isometric drawings taken from the model, construction buying is simplified, and the procurement of piping is much more accurate. Also, from these isometries, the craftsmen can work more efficiently because these drawings are easier to read than orthographic drawings. The field supervisors can then spend less time on details and more time coordinating the project. Effective modeling will reduce the amount of piping rework substantially. As compared with piping installations from orthographic drawings, a 15 to 20% reduction in installed piping cost can often be realized by proper use of this tool. Likewise, it is expected that the installed cost of sanitary piping would be reduced at least by the same magnitude.

It has often been demonstrated that the most satisfactory results from all viewpoints can be secured through centralized control and responsibility. Based on this sound principle the engineering-contractor should provide a comprehensive over-all service that includes effective cost control. Under such an arrangement, all phases of engineering, procurement, construction, erection of buildings, and plant start-up can be performed under a single contract that is especially adapted from an accounting standpoint to the individual food processor's needs. The records and books of the engineering-contractor are then open to the client, except for lump-sum contracts, insofar as they relate to reimbursable costs. On cost-and-free contracts, the client not only approves all expenditures but he is also entitled to receive the benefit of cash discounts and any resale discounts from vendors. The cost control program should be flexible enough so that the client can incorporate or delete a phase of a preventive sanitation and housekeeping program from the rest of the project in sufficient time to prevent serious disruption of the project schedule. Such effective cost control is not achieved by any short-cut method but is acquired over a period of years by the integrated team of the engineering-contractor who works in close collaboration with the client to give him the highest possible value for each dollar spent.

None of us would knowingly ask an accident-prone driver to teach us safe driving. The same principle applies in selecting an engineering-contractor. Consider his safety record and ask him to compare this record with that of the National Safety Council. Also compare his construction safety record with that of others in the Associated General Constructors of America. Sanitary and housekeeping programs don't just happen—they are caused by conscientious people. Likewise an excellent safety record for an engineering-contractor is caused by adequate technical background, good supervision, and thorough safety programs. An engineering-contractor with a good safety record will, as a matter of course, think of sanitation and good housekeeping.