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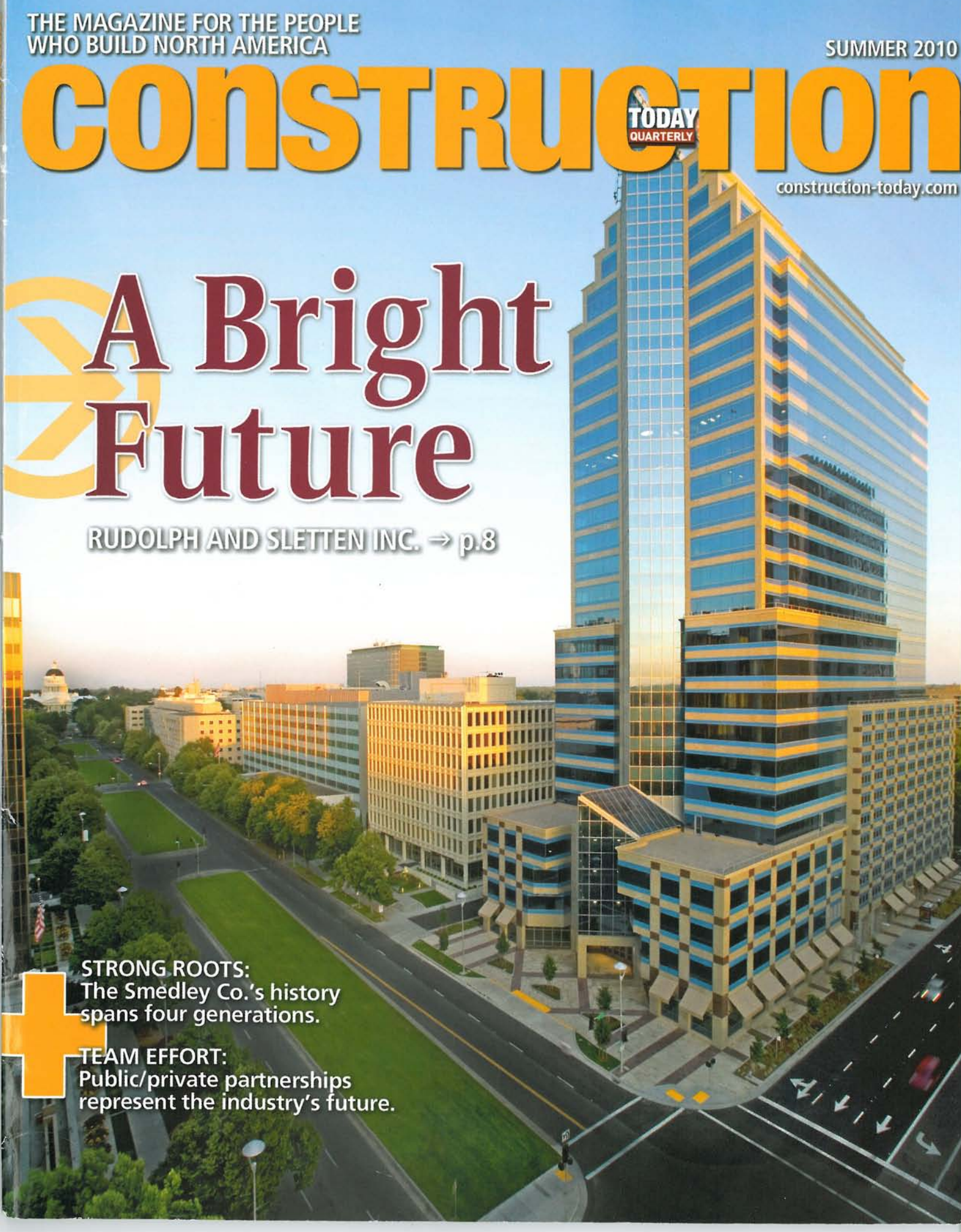
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## A Bright Future

RUDOLPH AND SLETTEN INC. → p.8

**STRONG ROOTS:**  
The Smedley Co.'s history  
spans four generations.

**TEAM EFFORT:**  
Public/private partnerships  
represent the industry's future.







# What's the COST?

Cost determination is a process in and of itself. BY DAVID SKINNER AND MELANIE TUNGET

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Cost is often the single most important consideration when it comes to building a laboratory or technical facility. Yet, determining the actual cost to design and build one of these facilities presents many challenges. These projects are generally complex in nature and "systems" driven, and each facility will possess its own unique functions requiring careful planning in order to provide accurate estimates and cost-effective solutions.

For many years, the buyers of construction services have sought simple solutions for determining their budgets for the construction costs of laboratories and technical facilities. The simplest solution is a formulaic cost estimate based on an average cost per square foot for a set of laboratories and technical facilities already built. This formulaic approach to cost estimation has proven effective for certain types of construction projects, including office buildings and retail centers.

However, it's not as simple to apply this formulaic approach to other facilities; each industrial, commercial, analytical and R&D laboratory or technical facility has its own functional requirements and environmen-

tal considerations. Therefore, using an average cost per square foot in budgeting for commercial and industrial laboratories leads to three possible outcomes, two of which are undesirable. These outcomes include project cancellation because the projected construction costs exceed the funds authorized for the laboratory, or the project runs over budget when the costs are finally determined during the bidding process – typically a time when it is difficult to obtain additional funds or, the project is completed within the original budgeted amount. In the absence of a careful analysis of the primary building systems necessary to support the science or processes required by the laboratory or technical facility – the probability of a "square foot" estimate coming in within the

actual costs of construction is extremely improbable. Remember – the average cost per square foot is just that, an average; and this mean value can represent the costs from a wide array of disparate facilities.

In order to manage the project budget, accurate conceptual estimating is imperative and must address the individual needs of the facility early on in the project. The estimate should reflect an appropriate facility for the laboratory or technical facility owner's immediate and long-term needs, which can be based on minimal design criteria so long as the right information is gathered by a qualified laboratory consultant or estimator. Developing an accurate conceptual estimate produces positive outcomes because it allows for accurate budgeting of the laboratory and related technical systems for the project.

Each facility will require special systems, and designing and installing these systems is dependent on the specific work requirements conducted at the facility. A qualified laboratory consultant or estimator understands the varying operational and safety requirements that significantly impact decisions about mechanical design criteria, HVAC systems, electrical capacity and routing, plumbing systems, safety codes and risks, and interior finishes including flooring, ceilings, paint and wall finishes, and lab furniture. Additionally, significant long-term cost savings can be realized if the current and future uses of any laboratory or technical facility are considered in the initial design phase. For example, if a facility will have specific flooring requirements, installing the appropriate flooring in the first place will eliminate the expense of renovating the lab and installing the proper flooring later. Similarly, certain HVAC options are preferable to others depending on the systems that will be required to support the intended use of the laboratory or technical facility.

Because laboratories and technical facilities require special mechanical, electrical and plumbing systems, the design and installation of each of these systems depends on the specific requirements for the work that will be conducted in the facility. The proper sizing of exhaust systems for fume hoods is critical to ensure a safe airflow that meets federal codes and OSHA guidelines. Also, the number

## 'Cost is often the single most important consideration.'

and type of hoods to be used concurrently may indicate that variable air volume controls are preferred. When it comes to mechanical, electrical and plumbing systems, there is a broad range of quality and cost of materials, which are critical variables in the overall cost of a laboratory or technical facility. Again, careful consideration of each system and the long-term requirements of the facility in the earliest stage of design can yield significant cost savings over the lifetime of a laboratory or technical facility.

The development of a conceptual estimate by a qualified laboratory design and construction team early in the planning stages of these projects can be critical to the ultimate approval and funding of the new facility. An experienced team that understands the functional requirements along with the special materials, building codes and other variables involved in building a laboratory or technical facility provides a design that is neither under- or over-engineered – and the estimated costs can be accurately forecast in a way that is not possible with a simple formulaic approach based on an average cost per square foot. The key is selecting a design/build team early in the process that brings significant experience to both the design and cost determination process. This ability to quickly develop an estimate that is within 10 to 15 percent of the ultimate facility costs allows owners to confidently move forward with funding requests and approvals.

A laboratory and technical facility consultant can also provide support by helping with decisions typically tied directly to cost such as whether to own or lease a building, or to design and build a new facility, or renovate/convert an existing building, or where to place a laboratory or technical facility within a building. These are other important considerations that a qualified team can help determine.

Determining and controlling cost in the design and construction of laboratories and technical facilities requires significant knowledge and understanding of the systems within these complex facilities. And, there is no simple, straightforward method for determining these costs. The client's needs are considered in conjunction with all the elements of design, engineering and construction. Value engineering can be included in each aspect of the project in order to save additional costs in the event that the desired design cannot be implemented within acceptable budgetary guidelines. And, when these issues are addressed up front with a project delivery team in the early phases of the project, there are typically few surprises during the project. Thus, the project's completion schedule is known and, most importantly, cost is controlled.

For more than 17 years, LCS has supported hundreds of laboratory and technical facility owners with the development of accurate estimates by use of a "design/build workshop." This cost-effective analysis of the owner's needs – and the development of true costs early in the conceptual phase of a project – is a time-proven approach to the development of a new laboratory or technical facility. ♦

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