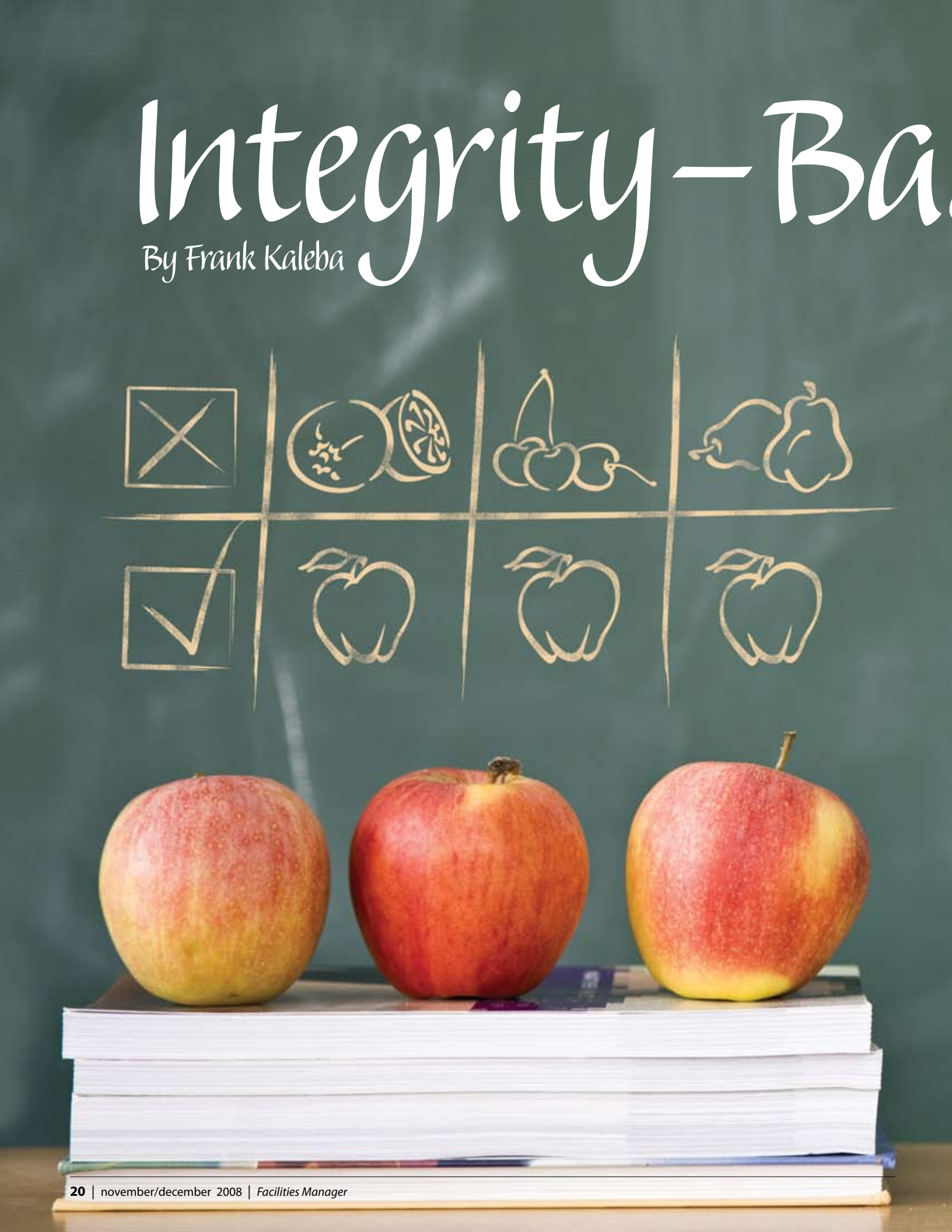
Integrity–Ba

By Frank Kaleba



sed Budgeting

Cost Factor X Inventory X
Area Cost factor X
Inflation Factor =

Sustainment Requirement

The central problem for the facility manager of large portfolios is not the accuracy of data, but rather data integrity. Data integrity, for the purpose of this discussion, means that it's

- acceptable to the users,
- based upon an objective source,
- reproducible, and
- internally consistent.

Manns and Katsinas, in their January/February 2006 *Facilities Manager* article "Capital Budgeting Practices in Higher Education," pointed out two major failings in capital budgeting practices for higher education: states (large portfolio managers) lack comparative data, and formulae are not used by state higher education agencies (large portfolio managers) to request funds from their legislatures. The lack of comparative data can be said to reflect the failure of data acceptability; and formulae are founded upon objectivity, reproducibility, and internal consistency.

One of the largest facilities portfolios in the country if not the world is that of the U.S. Department of Defense with over 800,000 facilities. Nearly a decade ago, it faced problems similar to those highlighted by Manns and Katsinas: there was no comparative data between the individual military departments (Army, Navy, Air Force, Marine Corps, and Defense agencies such as the Defense Logistics Agency), and no formula was used to request funds from the U.S. Congress. This led the Congressional committees with oversight and funding responsibilities to question the "integrity" of the data.

SOLUTION APPROACH

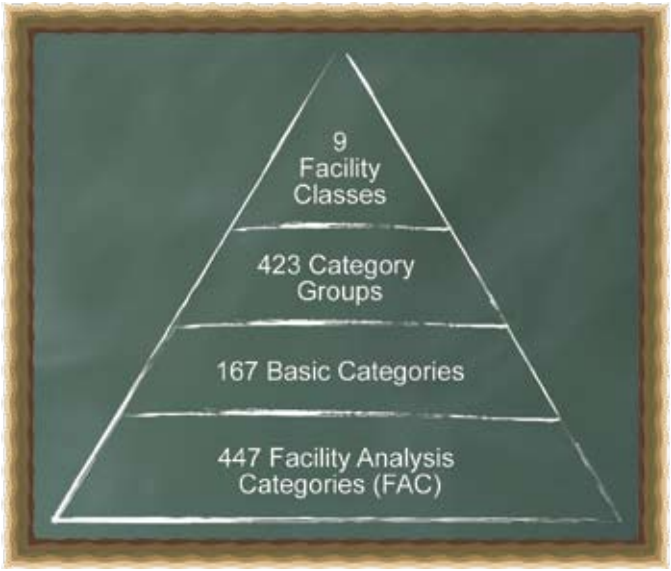
The solution developed by the Defense Department was to create a system acceptable to the Congress, using objective sources that could be audited and was reproducible from year to year and reproducible by others, and exhibited internal consistency – that is, similar facilities had similar requirements, and variations in local prices would be accounted for and visible.

Three important issues were critical to the evolution of a solution. First, what degree of accuracy was affordable? Second, with over 800,000 properties, how could this number be distilled to make a solution understandable to the user and still retain meaningfulness? And third, how would facilities requirements be defined?

Resolution of the first issue involved the use of the data, implementation, and cycle time. There were to be two primary uses of the data. First, the need to present to the Congressional appropriations committees a budget that was rational. Through federal fiscal year 2000, each of the Services had presented its own facilities budget, based upon four different metrics. Thus, there was no rational response to the question: why are maintenance costs for dormitories different for the Army, Navy, and Air Force? Responses were based upon historical actual costs plus inflation, a percentage of replacement value or engineering estimates with inexplicable "unplanned" maintenance factors. This led the Department to seek a single, rational system for all.

This large-scale scope of the requirement was balanced by the primary use of the data as high-level, programmatic information for the Congress. Thus, while the number of facilities was significant, the degree of detail needed was not. The Congress was not interested in examining the maintenance budget for dormitory X at installation Y – it was interested in providing sufficient funds for all the facilities needed by a Service.

The other parameter was bounded by the federal budget process. Every two years a new biennial budget was submitted and in the "off" years, adjustments were submitted. Thus, fresh data would have to be prepared at least every two years. This necessarily meant that no detailed field inspections could be made as the cost would be prohibitive.



Taken together, these two factors meant that a high-level, credible system, with a refresh rate of not more than 24 months was required. Further, the degree of affordability was limited by the potential funding for this process. Previous efforts within the Services, focused on improving the accuracy of estimates, had generally failed due to cost. For a system that would include all the Services, the potential for an expensive system costing tens of millions was high. A determined effort was made to keep this "overhead" cost to less than $1 million for development and implementation.

The second critical issue – how could an inventory of 800,000 properties be distilled to an understandable but meaningful number – was resolved by developing a hierarchical taxonomy grouped by facilities use. This hierarchy grouped all real property into nine facility categories (for example, operation and training; medical) and a level called "facility analysis category" or FAC. The FAC represents a group of facilities with common use, common construction features, and therefore common cost drivers.

The final critical issue was the definition of facilities requirements. Through a collaborative process involving Defense Headquarters and the Services, definitions were developed for three aspects of portfolio management: sustainment, restoration, and modernization – now known throughout the federal government as SRM.

Sustainment includes those actions necessary to keep a good facility in good condition, extracting full use over the design life of the building. This includes regularly scheduled inspections, preventive maintenance, emergency response, and major repairs or replacements that are expected to occur periodically over the design life – for example, regular roof replacement, refinishing wall surfaces, replacing carpeting, replacing air conditioning units.

Restoration is the correction of damage due to failure caused by inadequate sustainment, excessive age, natural disaster, fire or occupant-caused damage over fair wear and tear.

Modernization describes those actions taken to implement new or higher standards, accommodate code changes, new functions, or to replace components that typically last longer than the expected service life of the facility – for example, foundations or structural members.

MODEL AND COST FACTOR DEVELOPMENT

Making all this work was somewhat like the famous Monty Python sketch teaching children how to play the flute on the children's show, *Blue Peter*. The sketch taught the flute by saying you simply blow through here and move your fingers up and down, and "that's how to play the flute." While clearly an over-simplification, the next step for SRM was to build cost models for each of the FACs – these included sustainment (what should be spent), modernization (what should be designated for facilities renewal), and most recently operations models for each, covering utilities, fire and emergency services, pest control, pavement clearance,

Selected Defense Facilities Requirements FY-10 • $ Billions	
Utilities	3.3
Fire and Emergency Services	1.1
Sustainment	11.1
Facilities Engineering	1.3

and similar facilities operations functions.

The most mature of the models is the sustainment group, with a separate cost factor for each of 440 FACs. Overall, facilities sustainment represents an $11 billion requirement for Defense. The sustainment cost factor for each FAC is obtained from three source categories; the most valued source is based upon commercial or non-DoD sources. This includes about 200 parametric models built at the component level with the R.S. Means CostWorks© product. Other significant sources in this category include commercial quotations, trade association data, research reports, and state/local governments. The second source category is defined as costs obtained from DoD sources. The third source, representing only 3 percent of the total requirement, is developed by analogy to other FACs of similar complexity and durability. This category represents those very few unique facilities that typically only the military owns – for example, missile shelters or gunnery ranges.

Unit costs for each FAC are published as Unified Facilities Criteria (UFC) 3-701-(current year), and are available on the Web at *www.wbdg.org/ccb*. Updates are published annually.

The basic formula for using the cost factors is simple:

$$\text{COST FACTOR}_{\text{FAC}i} \times \text{INVENTORY}_{\text{FAC}i} \times \text{AREA COST FACTOR} \times \text{INFLATION FACTOR}_{\text{YEAR OF INTEREST}} = \text{SUSTAINMENT REQUIREMENT}_{\text{FAC}i}$$

Summing for each of 440 FACs, and for each site, the total is the sustainment requirement for the Service, or for the entire Department of Defense. The models in which these cost factors are used allow for costs to be segregated in a number of ways. The costs for each funding organization or fund source can be identified – for example, the Naval Reserve (organization) is funding a requirement using its "operations and maintenance" (fund source) account.

APPLICATIONS FOR EDUCATIONAL FACILITIES

The use of a similar approach in an academic environment could directly solve the shortcomings Manns and Katsinas described. The meta-system used by the DoD and being adapted by other federal agencies allows for a single, formula-based method of estimating requirements, performing comparisons, and objectively allocating resources. At the state or local school system level, a similar methodology could allow sustainment requirements to be quickly and inexpensively estimated, and allow available funding to be applied where needed.

For example, in a multi-institution system, requirements would be determined by the facilities components (use, roof type, mechanical system complexity) and allocated based on objective, modeled requirements. Boards or legislative bodies could rely upon the objectivity of the requirements. Needless to say, this approach works only for sustainment, while restoration – that is, repair work carried out because of the lack of sustainment or damage – would be separately estimated through inspection.

To adapt such an approach, the system would first either make use of the cost factors in the Unified Facilities Criteria, or develop specific new cost factors for its facilities. In the federal system, the use of a single average cost factor for a group of buildings is workable because there are a sufficient number of each kind of facility to allow a major cost in one year for one building to be balanced by lower costs for other buildings. For example, a significant peak cost occurring in the 20th year of a instructional building, (say, the replacement of its air conditioning plant) is smoothed (averaged) by other, similar buildings requiring the air condition plant replacement in different years.

With a sufficient number of similar buildings (the facility asset category or FAC mentioned earlier), each with a different in-service date, peak requirements are spread over multiple years. The larger the number of buildings, the smoother the annual average. This reliance upon the "law of large numbers" becomes less robust as the number decreases. But, for small numbers of facilities, for example, a local school system with only 10 or 20 school buildings, it becomes economical to construct individual cost models for each building.

RESULTS

Engaging as this process may be, it is the results that count. And the results have been significant for the Services. Interestingly, the results closely parallel the recommendations of Manns and Katsinas. The tangible results have been:

- Recognition by the Congressional budget committees of a reasonable and consistent method of *justifying* requirements. This has, in turn led to a remarkably easy approval process for facilities budget requests within the Congress.
- Within each Service, retention of facilities funds for facilities requirements and a decrease in the tendency to migrate resources out of facilities. In large part, this has been the result of Congressional language requiring the Services to report reductions in the appropriations for facilities sustainment.
- Creation of a means to benchmark facilities requirements across Services and within each Service among installations (campuses). This has proven useful in the resource allocation process by providing an independent and objective means to allocate, rather than relying upon subjective methods.

A 2008 U.S. Government Accountability Office (GAO) audit lauded this approach and its cost factor methodology, while suggesting improvements and additional funding be applied to hone the cost factors for a small group of factors representing about 3 percent of the total sustainment requirement.

Additional models have been developed for modernization and operations costs, such as utilities, facilities management and engineering, pavement clearance, and custodial. Overall, the methodology has proven itself as a robust means of determining long-range requirements and garnering the support needed to ensure those resources are available.

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