APPA Researches: Implementation of Total Cost of Ownership

By Douglas K. Christensen, APPA Fellow

An exciting research project is currently underway at APPA through the Center for Facilities Research (CFaR) that you need to know about. The concept of Total Cost of Ownership was first introduced to you with a research project and subsequent publication entitled *Buildings…The Gifts That Keep on Taking: A Framework for Integrated Decision Making*. As with all great theories, it is now time to test the theory with actual implementation of the concept. Hence this new research project, Implementation of Total Cost of Ownership (TCO) Principles Into Higher Education as an Integrated Decision-Making Tool. Let me share with you where we are on the project.

CFaR | Center for Facilities Research

PROPOSAL AND PROJECT BENEFITS

This study will focus on the principles of TCO and will be in alignment with both interoperability and sustainability practices. APPA will invite 25 to 30 institutions to participate in this study. The data collected from these institutions will provide the necessary data for analysis and establishment of a "standard of practice" for the industry and could result in a standard for applying TCO and/or a guideline for utilizing TCO in facilities management.

The study is being administered as part of APPA's Center for Facilities Research, and has received major funding from ASHRAE, the American Society of Heating, Refrigerating, and Air-Conditioning Engineers. Agile OAK was selected as an industry survey partner. Doug Christensen is the project's principal investigator and primary author.

Research benefits include:

- An inventory of recently built buildings
- Recent cost/sq ft on new construction in higher education
- Project soft costs reporting on each project
- Aligning APPA's Facilities Performance Indicators report (FPI) with other TCO costs factors
- Facility Master Plan established for:
  - Growth & Impact projects
  - Retrofit & Improvement projects
  - Programmatic Upgrade projects
- Life-cycle management of five major system assets through annual inspections
- TCO costs comparison between institutions on five systems' assets
- Establish data elements and the process to provide the TCO costs factors and how it can benefit institutions in terms of integrated decision-making

PROJECT PLAN/DETAILS

The TCO principles will provide a library of building data/information on the **Birth and Burial** project costs occurring at universities, tracking **Maintenance & Operations** costs against system assets, and **Recapitalization** costs. Data on five key institutional assets will be used to track and compare life-cycle TCO. The TCO principles divide costs into three types of cost groups/factors:

- Birth and Burial
- Maintenance & Operations
- Recapitalization
- (non-recurring costs)
- (annual recurring costs)
- (periodic recurring costs)

There are a minimum of five system assets we would like to identify, locate, inventory, and manage as a life-cycle cost database. Institutions can choose to do more. These five are required and results can be shared between the institutions. The five system assets are:

- Building Envelope - Roof
- HVAC Systems
- Electrical Systems
- Floor Coverings - Carpet
- Parking Lots

Each participating institution will provide a minimum of four building types or they can choose to inventory the entire campus. The institution can provide these five system assets or do more. These four are required for the research. The industry partner's software tool will be used to collect and manage the detail for our research and analysis.

Once the assets are setup in the system and information is shared with institutional leaders, the results will be shared between key institutions. It will also show a total cash flow average per year needed for each asset at each institution. Each institution will share costs, installs, service, performance, etc., about each asset as approved be each institution. This

data will be considered to add to FPI so that the cost of maintaining certain assets can be shared.

PROJECT TIMING

To date the research team has secured the funding, designed the survey instrument, initial test of survey tool, and in the process of finishing the beta test of eight institutions. The next step is to finish the beta, analyze what has been learned from the beta, and prepare to launch the survey of the additional institutions.

Following the completion of the 25+ institutions, time will be spent to analyze the results and then report the finding back to the institutions. We plan to get feedback from each institution around the questions of "Should TCO be implemented by the institution?" and "What are the advantages and disadvantages of doing it?"

TCO Beta Survey Participants

- Brigham Young University
- Carleton University
- United States Coast Guard Academy
- University of Illinois Urbana-Champaign
- University of Maine
- University of Maryland Baltimore
- University of New Mexico
- University of Texas Austin

We will keep you up to date. If you have any feedback or would like to be considered as part of the 25+, please let us know.

Doug Christensen, an APPA Fellow and past APPA President, recently retired from Brigham Young University, Provo, UT, after nearly 39 years of service. He can be reached at *dkchristensen@comcast.net*.

TCO Project Committee

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