

TOPIC 13. SERVICE LIFE AND REPLACEMENT CYCLES

1. GENERAL: Design VA facilities in a cost-effective manner while providing an environment that promotes quality health care, which:

- a. Allows staff to maximize patient care and provide efficient medical services.
- b. Is user friendly to patients and staff.
- c. Offers best value for construction dollars.
- d. Meets industry standards for maintainability.
- e. Remains attractive and provides a visual statement of quality health care.

2. SERVICE LIFE: Design the structure and exterior skin, respectively, to support specific loads and to provide a weather tight enclosure so that the critical building systems inside the building have a finite service life. Recommended service life of the building's critical individual components are identified below, assuring appropriate maintenance:

| CRITICAL BUILDING | SERVICE LIFE | PERCENTAGE OF COST OF |
|--|--------------|-----------------------|
| Structural (foundation, sub-structure, & superstructure) | Indefinite | 20% |
| Exterior Skin | Indefinite | 12% |
| Roofs | 20 Years | 2.5% |
| Interior Construction/Equipment | 10 Years | 24% |
| Mechanical Systems | 25 Years | 25% |
| Electrical Systems | 20 Years | 12% |
| Automatic Transport | 25 Years | 4.5% |

3. DEFINITIONS

a. **Service Life.** The average time during which a particular system or component remains in its original service application and when it should be replaced. Replacement may occur for any reason, including, but not limited to failure, general obsolescence, reduced reliability, excessive maintenance cost, and changed system requirements due to such influences as changed functional programs or energy prices.

b. **Critical Component.** Major system without which the facility could not provide its primary function

- c. **Major Component**. Building System that is 10% or more of the cost of the facility.

4. CRITICAL BUILDING SYSTEMS: The following is a list of **typical, but not limited to**, design for critical building systems which impact service life of facilities:

a. **Architectural Systems**

(1) **Roofs**. Provide long-lived and leak-free roofs. Geometry of very large buildings dictates a flat roof, restricting the choice of materials to built-up or single-ply membranes. Smaller buildings may have pitched roofs, allowing more material options, such as asphalt shingles, metal, or tile.

(2) **Windows**. Design windows for low maintenance, trouble-free operation, weather-tightness, insulating value, security (in psychiatric areas), and appearance. Operable windows are the easiest and least costly type if the facility cleans its windows with in-house staff. For large scale facilities, such as hospitals, the most satisfactory type are side-hinged windows. Fixed windows (non-opening) are less costly initially and may last indefinitely since they have no moving parts. However, fixed windows have higher maintenance cost since they must be washed from the outside, usually by professional window washers

(3) **Interiors**. Use materials that are typically hard surfaced and durable and have an architecturally pleasing appearance. Damage to finishes may occur more frequently because of extended footrests on wheelchairs or type of patients, such as those with substance abuse or psychological problems.

- (4) **Ceilings**. Normally, provide 600 mm x 1200 mm (2' X 4') lay-in acoustical tile (AT) systems, which is the most common and cost effective system that is in line with the standard practice of private sector. Use plaster only in limited areas where infection, cleaning and security are of paramount concern. Avoid the use of AT systems with regular (recessed) edges that cost more. Base ceiling selection on acoustic performance, low replacement cost, and initial cost.

- (5) **Floors**. Provide vinyl composition tile (VCT) or sheet vinyl (SV) for general use medical areas, ceramic tile (CT) for wet areas, quarry tile (QT) for heavy duty areas like kitchens and SPD, carpeting (CP) for office, waiting, and special areas, and special material, such as pavers, for entrance/lobby spaces. Select flooring for safety and functional appropriateness first, then life cycle maintenance and durability (see PG-18-14 for recommended finishes and materials).

- (6) **Walls**. Use (1)gypsum wall board (GWB) with bumper guards and handrails for corridors; (2)gypsum wall board for rooms with paint or wall covering; ceramic tile; (3)full height or wainscot for wet areas; (4)hard plastic panels, ceramic tile, painted plaster, or concrete masonry units for heavy duty areas; (5)plaster/veneer plaster for operating rooms; and (6)special materials for lobbies. Select colors and textures that keep the best appearance for the longest period possible. Base selections of initial cost,

required maintenance, and potential for damage (see PG-18-14 for recommended finishes and materials).

b. **Mechanical Systems**

(1) **Air Handling Systems**. Design air handling systems to provide temperature, humidity, ventilation, and air quality control of indoor space. Include component equipment such as heating and cooling coils, fans, air filters, dampers, intake louvers, humidifiers, and controls. Select equipment based on size constraints, functional areas being served, available space, and environmental conditions required. Consider hours of operation, ambient air conditions, cleanliness of ventilation air, quality of water service, ability or accessibility, and quality of maintenance.

(2) **Ductwork Systems**. Design galvanized metal ductwork/air distribution systems in accordance with the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) national standard. For a few limited areas, including surgery, provide wet hood exhausts and corrosive hood exhausts; use other materials, such as stainless steel, for safety and infection control.

(3) **Chiller Systems**. Design chiller systems, including controls, pumps, piping, and valves, to provide chilled water for cooling. A minimum of two chillers is needed to provide efficient operation and redundancy.

(4) **Boiler Systems**. Design boilers to distribute steam throughout the medical center for space heating, sterilization, food preparation, and dishwashing. Typically, boilers are gas/oil fired high-pressure steam generators with dual fuel capability and required safety and operating controls. A minimum of three boilers is required. Select units based on connected loads, air pollution standards, and federal energy conservation statutes.

(5) **Piping Systems**. Design a piping system that distributes fluids and gases throughout the facility. HVAC piping is predominately black steel piping systems; copper piping used for domestic water and medical gases; and cast iron and PVC used for waste lines.

c. **Medical Gas Systems**. Design these systems. to include air compressors, air dryers, filters, vacuum pumps, manifolds, alarms, and piping systems, to provide life support for patients critical needs.

d. **Elevators**. Design hydraulic type elevator systems in buildings with 4 floors or less and electric traction-type elevator systems in buildings of 5 or more floors use.

e. **Electrical Systems**. Design electrical systems to provide lighting and communications for occupants, and power for specialty equipment and building systems such as elevators and air conditioning. Select system components based on user requirements, safety, and life-cycle costs.