



Aviation Short Course



Facility Condition Assessment, Facility Condition Index



Objectives

- ❑ To take a fresh look at what else might be done to address our infrastructure.
- ❑ How can we use models, logic, and knowledge gained from other infrastructure systems to address some of the issues? (NASA approach, highway-pavement management, bridge management, public buildings, etc)



Can You Accurately Report the Current Conditions of Your Facilities?

In this context FACILITIES are buildings or types of the infrastructure other than Communication, Navigation and Surveillance (CNS) systems.



Can You Accurately Report the Current Conditions of Your Facilities?


Condition by:

- Facility System
- Individual Facility
- Facility Classification or Type
- Site

For federal facilities, Federal Accounting Standards Advisory Board Standard #6 requires an annual facilities condition assessment.



Do We know...

- What condition your buildings should be to meet the mission operations, safety, and habitability requirements of your agency
 - the annual sustainment cost of facilities
 - the annual renewal or repair cost of facilities
 - the renewal/repair cost to increase the condition of buildings/facilities to meet the mission, and habitability requirements of your agency?
- 
- A horizontal bar at the bottom of the slide with a blue-to-white gradient.



NASA Method



Definitions

- **Current Replacement Value (CRV)**

Cost and engineering estimate of materials, supplies, and labor required to replace a facility or item of equipment at its existing size and functional capability.

- **Deferred Maintenance (DM)**

Maintenance that was not performed when it should have been or was scheduled to be and which, therefore, is put off or delayed for a future period.

(Federal Accounting Standards Advisory Board (FASAB), Statement of Recommended Accounting Standards Number 6, September 1995).

Deferred maintenance DOES NOT include alterations and modifications, expansion in size or capability, work to address major technical or functional obsolescence, or other types of “new work.”



NASA Method



Definitions

- **Maintenance**

The act of keeping fixed assets in acceptable condition.

- **Facility Condition Index (FCI)**

Not the traditional definition which is DM / CRV. Based on system ratings, this is the weighted sum of condition ratings for facility systems.

For each Center, the FCI is the weighted average of all systems for all Center facilities. For NASA it is the weighted average of all systems for all facilities.

- **System Condition Index** - This is the weighted sum of the systems similar to the FCI from the system level to the agency level.



NASA Method



The Approach

- Utilizes Agency's Real Property Inventory (excludes land value) to create a database
- Use independent teams to complete the assessments
- Rapidly inspect systems (9) in each facility
- Rate condition of each system from 5 (Best) to 1 (Worst)
- Parametric models convert condition ratings to renewal/repair/capital investment cost estimate based on facility Current Replacement Value (CRV)
- Models account for different facility types (42)

Approach Products: System Condition Index (SCI), Facility Condition Index (FCI), & DM Cost Estimate



The Facility Condition Index



Facility Condition Index:

- Developed by the National Association of College and University Business Officers.
- Provides a means for objective comparison of building condition among geographically dispersed sites.
- Provides a clearer picture of building renewal funding needs.
- Data from professionally performed facility condition assessments.



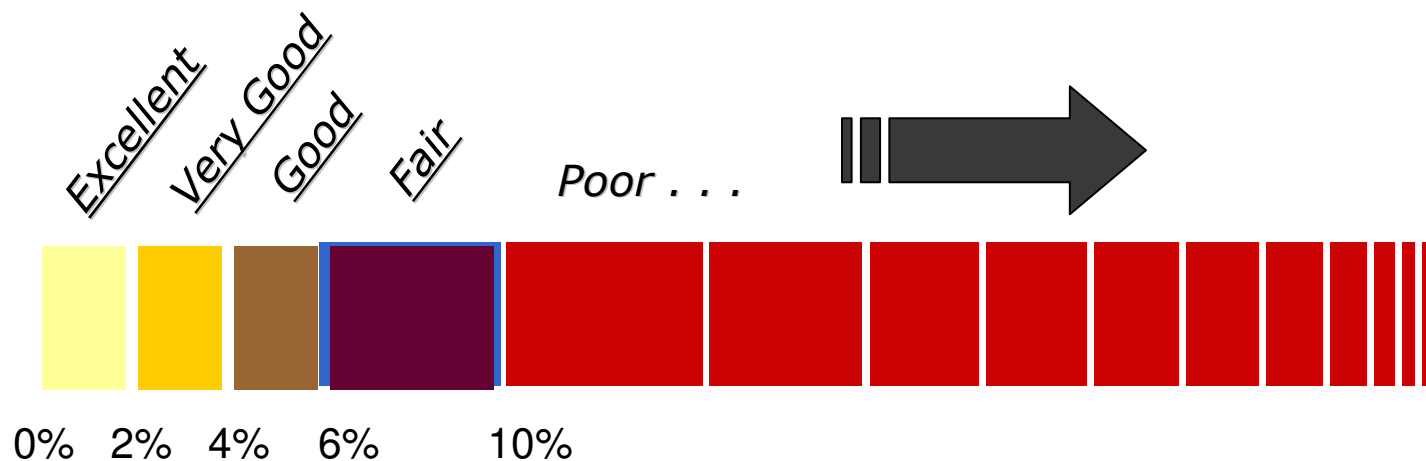
The Facility Condition Index



Facility Condition Index (FCI)

Is an industry standard parametric tool used to relatively compare building conditions.

$$\text{FCI} = \frac{\text{total cost of existing repairs}}{\text{current replacement value}}$$





The Facility Condition Index



If FCI greater than .30 facility is in critical condition.

Facility should either be:

- upgraded or
- replaced



NASA Method



Create the DM Database

- Download the Agency's Real Property Inventory into the DM database.

Facility types in the DM database:

- R&D and Test Buildings
- R&D Structures and Facilities
- Administrative Buildings
- Communications and Tracking Facilities
- Launch Pads
- Electrical Distribution
- Power Generation
- Substations
- HVAC Distribution
- HVAC Generation
- Potable Water Distribution
- PW Treatment Plants



Whitestone Research



Whitestone Building Maintenance and Repair Cost Reference 2004 - 2005. Includes detailed maintenance and repair cost statistics for 200 U.S. metropolitan areas and 10 Canadian cities.

Rank	Metropolitan Area	Cost per Square Foot*
1.	New York, NY	\$3.39
2.	Yonkers, NY	\$3.05
3.	San Francisco, CA	\$2.96
4.	San Jose, CA	\$2.84
5.	Philadelphia, PA	\$2.80
6.	Trenton, NJ	\$2.78
7.	Oakland, CA	\$2.74
8.	Stamford, CT	\$2.72
9.	Hilo, HI	\$2.71
10.	Jersey City, NJ	\$2.70

* M&R cost of a model 2 Story Office building over a 50-year period.



NASA Method



Condition Assessment Rating

There are 5 Condition Ratings

- 5 (Excellent) – Only normal scheduled. maintenance required
- 4 (Good) – Some minor repairs needed; functions okay
- 3 (Fair) – More minor repairs required; mostly functional
- 2 (Poor) – Significant repairs required; system not fully functional for bldg use; does not meet all codes
- 1 (Bad) – Major repair or replacement required to restore function; system unsafe
- 0 (Absent) – A system that does not exist in a facility



NASA Method



Basis for the Parametric Model

- DODs *Parametric Cost Estimating System* (PACES); facilities construction data by facilities system
 - *PACES* is an integrated PC-based parametric budgeting and cost estimating system developed by Earth Tech that prepares parametric cost estimates for new facility construction and renovation. It is accepted estimating tool for federal construction projects that is based on an evaluation of more than \$40 billion of federal facilities projects
- *RSMEANS* Construction/Repair data
 - North America's leading supplier of construction cost information
- NASA Historical Repair/Renewal cost



FHWA



FHWA – Federal Highway Administration Roads and Bridges

- Urban roads and streets are one of the few areas of infrastructure having overall condition ratings.
- FHWA develops “present serviceability ratings” every two years for roads throughout the entire nation
- Among cities’ capital assets, bridges can represent special hazards such as bridge collapse or accidents caused by narrow widths and blind approachways.
- The ability of a bridge to serve traffic is related to its structural condition and the demands placed on the structure.
- The most frequently cited factors affecting bridge condition are the age, maintenance levels, traffic intensity and weight (or loading factors), climate, and bridge design.



Runway Pavement Condition



Airfield pavement needs regular maintenance to seal cracks and repair damage, and major rehabilitation is needed on a 15- to 20-year cycle to remedy the effects of age and exposure. If pavement is neglected, severe deterioration can cause damage to propellers, turbines, and aircraft landing gear.

In July 1998 the General Accounting Office (GAO) completed a report on runway conditions at national system airports. The GAO collected data on runway pavement condition from about 35 percent of airports eligible for Federal funding and determined that approximately 88 percent of the runways in the sample were in fair or better than fair condition.

Source: NPIAS



Runway Pavement Condition

Runway pavement condition is classified as:

- good (all cracks and joints sealed),
- fair (mild surface cracking, unsealed joints, and slab edge spalling),
- poor (large open cracks, surface and edge spalling, vegetation growing through cracks and joints).



Runway Pavement Condition

Data for 2000 indicate that, nationwide

- 73 percent of runways at NPIAS airports are rated good
- 22 percent are fair,
- 5 percent are poor.

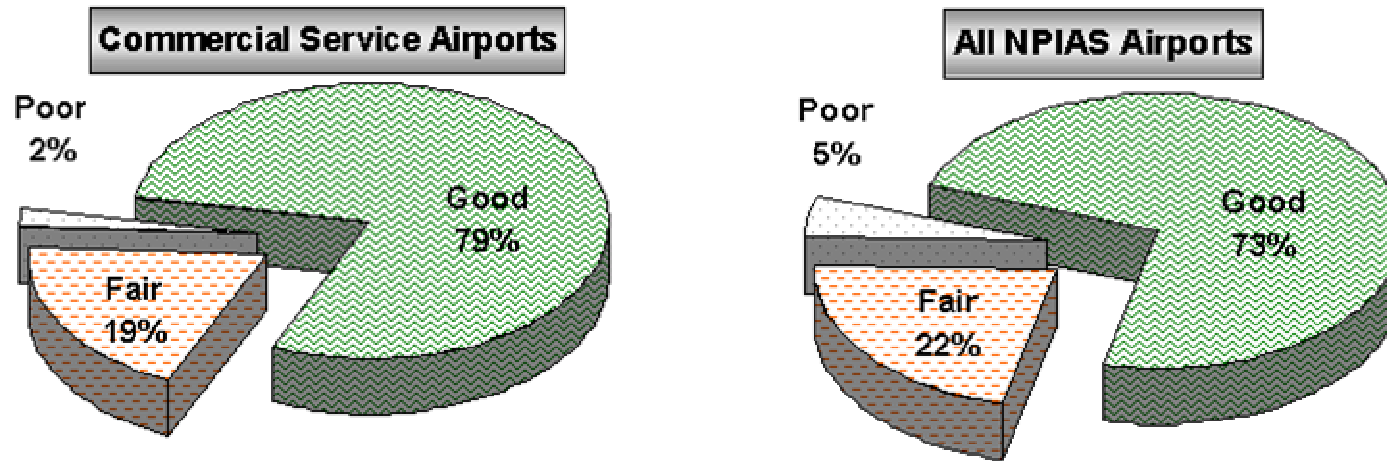
Pavement at commercial service airports is much better than average, with 79 percent good, 19 percent fair, and 2 percent poor. Poor runways at commercial service airports are not used by large aircraft.

They are usually short runways that are occasionally used by light aircraft to avoid crosswinds. Runways with potentially hazardous pavement deficiencies are temporarily closed by management pending resolution and repair.

Source: NPIAS



Runway Pavement Condition



Runway Pavement Condition (2000)

Source: NPIAS