Facility Condition Index

by

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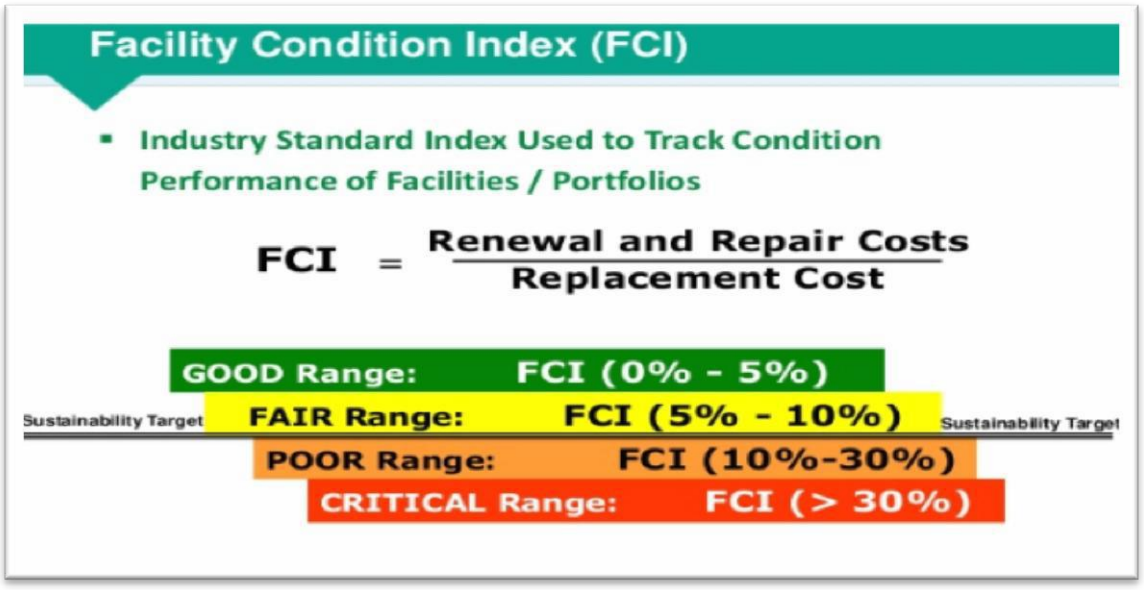


The facility condition index (FCI) is used in facilities management to provide a benchmark to compare the relative condition of a group of facilities. The FCI is primarily used to support asset management initiatives of Private organizations and local government facilities organizations. This would also include universities, housing and transportation authorities, and school systems. A Facility Condition Assessment involves a team of one or more specialists inspecting each system in a building to understand its condition. You can even start with a model of each building before sending teams to do the assessment. Systems include all mechanical, electrical, plumbing and architectural elements in a building; so for example, the team would review the chiller, electrical panel, and roof. There can easily be upwards of 80 systems in a building. The condition is based on any deficiencies and the remaining useful life of the system. Armed with this information, you can determine when system repairs and renewals will be required. Summing up the condition of each system can give you the overall facility condition, allowing you to target the proper level of investment based upon the function of the facility.

Mathematically the FCI is represented as

$$FCI = \frac{\text{Maintenance, Repair, and Replacement Deficiencies of the Facility (-ies)}}{\text{Current Replacement Value of the Facility (-ies)}}$$

A key performance indicator (KPI) which is used to objectively quantify and evaluate the current condition (ie., physical health) of a facility and to make two types of benchmark comparisons on the relative condition of that one facility with:

Other facilities within the same portfolio Against the same facility at a sometime in the past.

The FCI provides a measure of the "catch-up" costs of a facility (freehold property) and is typically derived from a Facility Condition Assessment (FCA) carried out by an experienced consulting team. In the case of a leasehold interest, the catch-up is quantified by the principle of permissive wasting.

It is important to note that FCI is a measure of condition relative to the reproduction cost of the building. FCI is not an absolute statement of the size of the backlog of catch-up work. A large and complex facility, with a high reproduction cost, requires a larger backlog of deferred maintenance to raise the FCI than a smaller/simpler building.

Purpose of the FCI

One of the benefits of gathering accurate facility data is not only that the true condition becomes clear, but also that it results in a benchmark to analyze the effect of investing in facility improvements. Developed by industry associations, this benchmark is known as the Facility Condition Index, or FCI. The FCI is the ratio of deferred maintenance dollars to replacement dollars and provides a straightforward comparison of an organization’s key estate assets. The principal value of an FCI rating, particularly for the owners and operators of a single facility or a portfolio of facilities, can be identified as:

- To assist in making resource allocation decisions amongst the buildings in a portfolio, particularly with limited budgets that are not adequate to address the deferred maintenance in all the facilities. It is therefore a means of identifying priorities.
- To determine the annual reinvestment rates to prevent further accumulation of deferred maintenance.
- To calculate catch-up costs.
- To provide a KPI for resource allocation decisions.
- To help track the extent of condition drift over time
- The FCI serves as the index of measure along the horizontal (x) axis of the following three multivariate analysis:
- Condition-Priority Matrix
- Condition-Age Matrix
- Condition-Energy Matrix

Some of the secondary values of an FCI rating for the facilities are as follows:

- A mechanism to monitor changing conditions over time.
- A means to demonstrate the level of effort, due diligence and responsible stewardship to various stakeholders.

The FCI Condition Scale

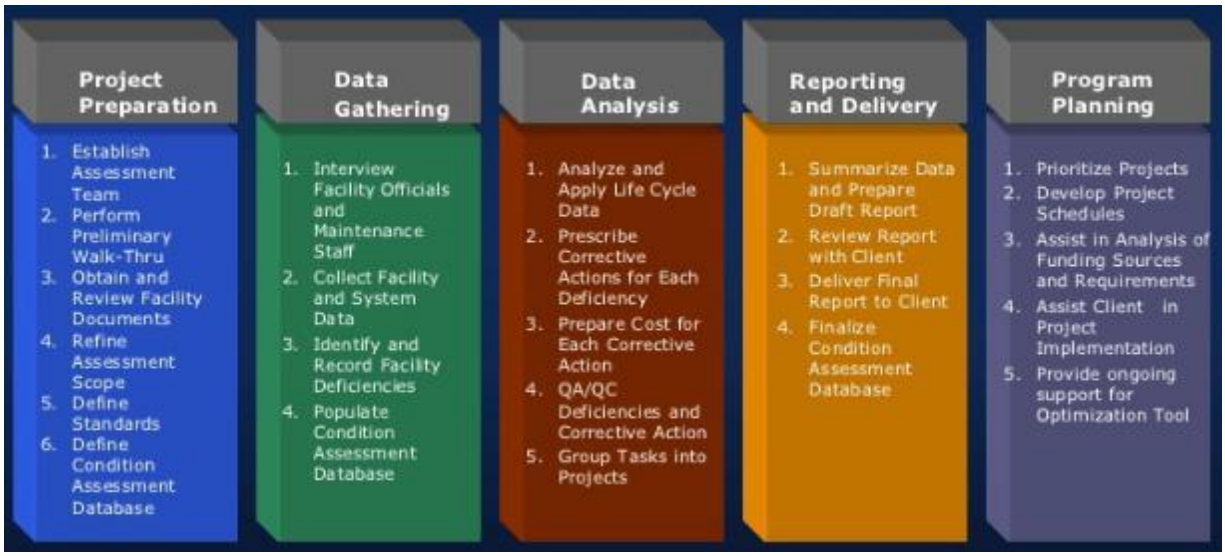
In accordance with the original formula developed in 1990, the relative measure of the condition of the facility (or facilities) is usually organized into a four-tiered condition scale, as follows:

"Good" Condition	- 0-5% of CRN
"Fair" Condition	- 5-10% of CRN
"Poor" Condition	- 10-30% of CRN
Critical Condition	- 30%+ of CRN

The terms ("good" etc.) are the linguistic scale that is underpinned by the numerical scale (0-5%, etc.)

Unfortunately these thresholds and their KPIs have been misinterpreted and misrepresented over the last few decades as a result of adjustments to the formula by different software vendors and engineering firms.

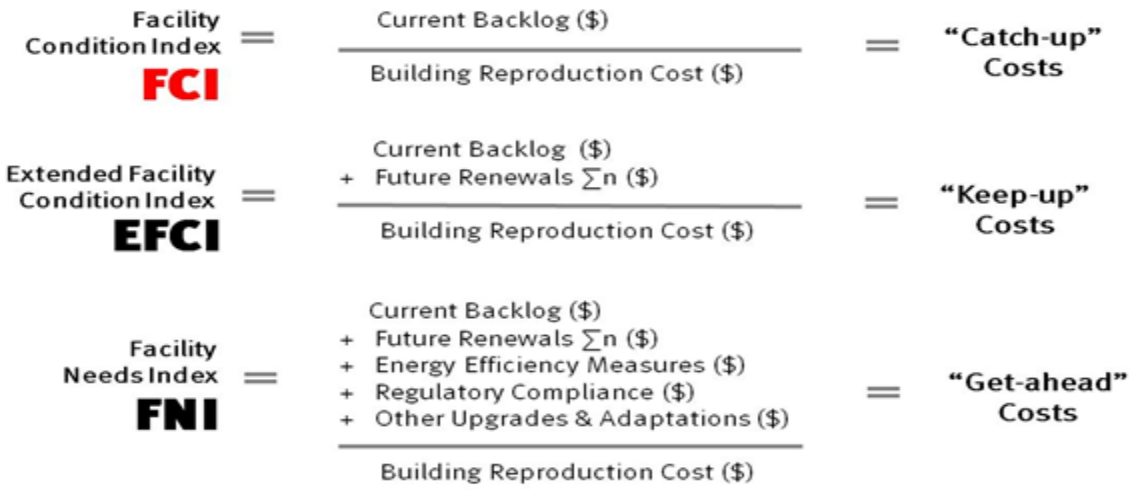
FCI Approach



FCI Formula

The FCI formula can be summarized as the ratio of all the deferred maintenance (the numerator) divided into the Current Replacement Cost of the entire facility (the denominator).
The numerator of the formula - this contemplates the catch-up costs and this includes deficiencies and deferred maintenance. The denominator of the formula - is based on the current reproduction cost of the facility. There are three general classes of reinvestment that are pertinent to an understanding of the value of a Facility Condition Index. The three classes are listed below.

- "Catch-up" Costs (FCI)
- "Keep-up" Costs (EFCI)
- "Get-Ahead" Costs (FNI)



Since the introduction of the FCI formula in 1990 there are two alternative methods that have been developed for determining the size of the backlog in the numerator of the formula:
Top-Down Backlog Calculation - This method is popular with software vendors who utilize algorithms to establish levels of deferred maintenance based on chronological age of the assets.

Bottom-Up Backlog Calculation - This method is employed principally be engineering firms to generate itemized lists of empirical conditions observed in the field.

In addition to the two methods of deriving costs, there are some differences of option as to the scope (type) of costs that should be included in the numerator of the formula. This has been bastardized over the decades by different consultants and software vendors. The original formula contemplated only "deficiencies", but some companies have started to included future lifecycle renewal costs.

These other classes of reinvestment should more appropriate be considered in other measures, such as the Extended Facility Condition Index (EFCI).

FCI Correlations

Since FCI is a snapshot of the current extent of catch-up, it is necessary to extend the analysis to include other variables, such as facility priority ranking and facility age. There are three common types of correlations utilized in the industry.

1. FCI and Mission Criticality (Prioritization)

The Condition-Priority Matrix plots the relationship between the relative condition and the relative priority of assets or facilities. within a portfolio. Listed below are the four quadrants in the analytic matrix.

- High Priority Facilities in Good Condition
- High Priority Facilities in Poor Condition
- Low Priority Facilities in Good Condition
- Low Priority Facilities in Poor Condition.

The horizontal ("x") axis is represented by the Facility Condition Index (FCI) and the vertical ("y") axis by the Mission Dependency Index (MDI).

2. FCI and Facility Age

The Condition-Age Matrix plots the relationship between the relative condition and the relative age of facilities utilizing 5- stage facility lifecycle model as follows:

- Life Stage 1: "Pre-natal"
- Life Stage 2: "Childhood"
- Life Stage 3: "Adolescence"
- Life Stage 4: "Adulthood"
- Life Stage 5: "Old Age"

If a facility has been undergoing all the necessary capital renewal projects, then there should be little correlation between the age and condition of a facility.

3. FCI and Energy Efficiency

The Condition-Energy Matrix plots the relationship between condition and energy efficiency of the facilities.

- Energy Efficient Facilities in Good Condition
- Energy Efficient Facilities in Poor Condition
- Energy Inefficient Facilities in Good Condition
- Energy Inefficient Facilities in Poor Condition

For example, the FCI analysis can be used to make decisions on whether to allocate funds towards Energy Efficiency Measures (EEMs) or towards routine facility renewal measures.

4. FCI and Facility Operating Standards

Different facilities are governed on different operating standards depending on their mission criticality and budget constraints.

- Level 1: Showpiece Facility
- Level 2: Comprehensive Stewardship
- Level 3: Managed Care
- Level 4: Reactive Management
- Level 5: Crisis Response

For example, if a facility is supposed to be operating at level 1: Showpiece (the target) but the FCI is above 10%, then the building is actually operating at Level 4: Reactive Management. These types of disconnects between targets and actuals can be addressed by either adjusting the targets to more realistic levels or reinvestment in the facility to improve the FCI rating.

Analytics and KPIs

Listed below are some of the analytics and KPIs that can return once the FCI has been established for one or more facilities in a portfolio.

- Portfolio Average FCI
- FCI Distribution by Building

Financial Modeling with FCI

Reinvestment is a reconciliation of the expenditure forecasts ("How much money will we need?) And the funding level ("How much money will we have?"). Sensitivity analysis asks the following two questions:

A. Linear Funding Models - This method asks the question: “If the owners fund at level x, what will be the resultant FCI each year?”

B. Lumpy Funding Models - This method of funding asks the question: "What should our funding be each year to ensure that the FCI remains at a certain level."

Target Backlog Backlog Projection Model

Evaluation

Listed below are some of the advantages and merits of the facility condition index (FC) as an asset management tool:

It has been tried and tested on thousands of facilities over the last 30 years.

There are industry accepted thresholds for "good", fair", "poor" and "critical" condition.

Some of the primary limitations of the facility condition index (FCI) as a measure are listed below:

It is not an absolute measure and is often used as a snapshot in time as a comparator to similar assets or as an index which quantifies the adequacy of a funding level over a longer period of time.

It focuses on issues that are Behind-the-Horizon but does not include future renewal projects that are In-the-Horizon.

Numerator Issues - Numerator Plasticity

The standard FCI formula does not include a weighting system to prioritize the relative importance of the backlog associated with each system or each within a facility. For example, an electrical-intensive facility such as a theatre may place greater mission criticality on the electrical system than on some of the other systems. This problem is partially resolved when the FCI is cross-referenced against a Priority Index in a 2-dimensional matrix.

The FCI does not include keep-up costs, which are derived from an extended FCI methodology.

The FCI does not include for any upgrades or adaptations that may be necessary to address the other forces of retirement that act upon assets, such as functional obsolescence.

Due to factors such as condition drift, the FCI values may become rapidly outdated. It is important to recognize that the FCI is always relative to a base year

Denominator Issues - Denominator plasticity

The fluid nature of the building reproduction cost calculation which can differ dramatically each year and result in an inconsistent FCI.

Management principles

Management of the data from the FCI can be administered through the following mechanisms and techniques.

Assessment Cycle - That is, how often the FCI should be updated. Some facility managers may deem a 5-year assessment cycle to be adequate, whereas others may consider a 3-year cycle more appropriate.

Assessment Match - That is, what level of assessment should be used to generate the FCI. For example, some facilities may be adequately evaluated with a top-down methodology whereas other facilities cannot be fully evaluated without a more rigorous bottom-up methodology.

Assessment Mix - That is, should facilities be assessed at the different levels of detail than other facilities. The FCI is a factor the quantum of deferred maintenance (in the case of a freehold) or quantum of permissive wasting (in the case of a leasehold interest).

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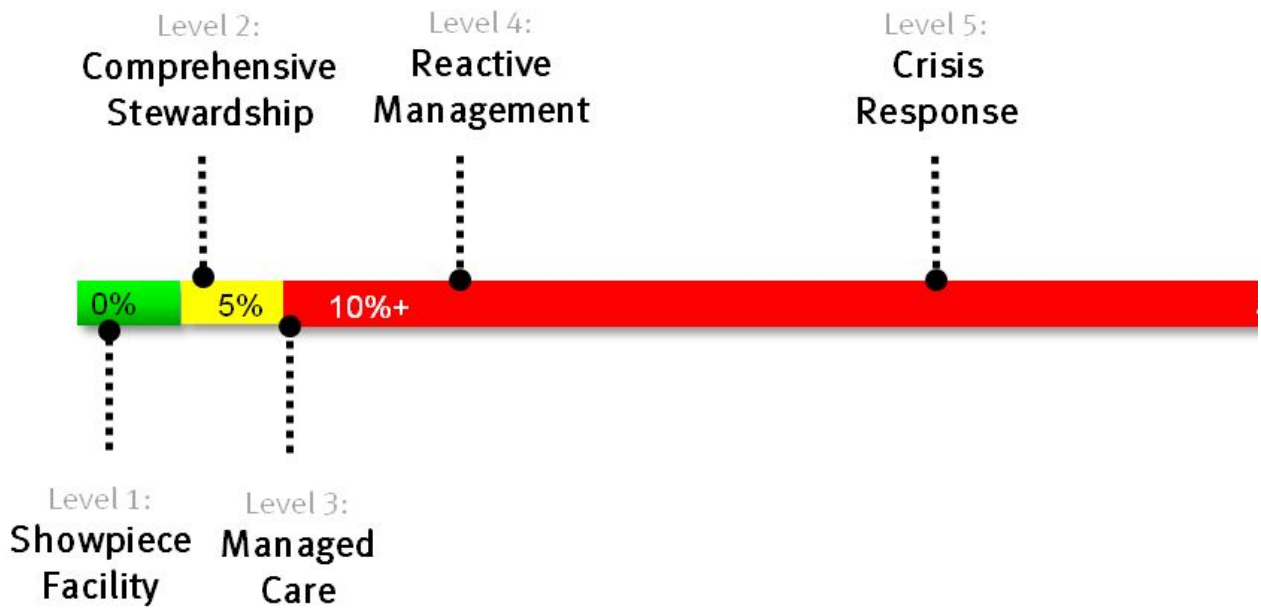

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