

# THE FACILITIES CONDITION INDEX

## AS A MEASURE OF THE CONDITIONS OF PUBLIC UNIVERSITIES AS PERCEIVED BY THE END USERS



by Robert Quirk

The Facilities Condition Index (FCI) is a term that has been used to describe the relative condition of campus (and other public and private) facilities in relation to the current replacement value (CRV) of that building. The purpose of this study was to determine if the relative satisfaction of the end users has a correlation with the building's FCI.

A 23-question survey instrument was utilized to gather information regarding satisfaction of the building occupants. Surveys were returned by 159 faculty, staff, and administrators from seven major buildings on the campus of California State University, Long Beach, out of 547 distributed, resulting in a 29 percent response rate. Seven buildings were selected to represent a wide range of conditions as measured by the FCI and those

with similar size (square foot). An evaluation of the questions, utilizing an alpha test, demonstrated a moderate relation to each other at .8114. Only three of the survey questions showed a correlation between the FCI score and the questions using Pearson's  $r$  (correlation coefficient) with a statistically significant relationship of  $p < .05$ .

The Facilities Condition Index has been professed as a systematic, if not scientific, method to evaluate the current condition of facilities. According to Briselden and Cain (2001) it is a comparative indicator of the relative condition of facilities. It is commonly referred to as the existing deferred maintenance (DM) backlog of a building divided by the current replacement value (CRV) of that building ( $DM/CRV=FCI$ ).

The FCI was developed through the efforts of the U.S. Navy, private companies such as Applied Management Engineering, and several professional, nonprofit organizations such as APPA and the National Association of College and University Business Officers, attempting to develop a numeric correlation of the FCI with the actual building condition. The intent was that the FCI would be a universally accepted, numerical assessment of the condition of facilities and a tool to

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determine fiscally related decisions regarding funding, major maintenance, and repair options.

The CRV is an assessment by the owner or owner's representative of what it would cost to replace the building in question. These assessments can come in many forms such as cost-per-square-foot estimates; professionally detailed replacement plans, specifications, and budgets; and building officials' best guess. The DM value is also obtained in a variety of ways at the discretion of the owner or owner's representative. This would include life-cycle cost projections, detailed facilities condition analysis, in-house evaluation, or educated guesses. The lack of control over input of this data constitutes a serious concern over the validity of the data that make up the FCI. The control of the input data is ultimately up to the individual owner or building official and thus, subject to personal biases.

**Method**

This study was based upon the results of a survey (Appendix I) from faculty and staff from seven major buildings at California State University, Long Beach. The campus FCI was used as the independent variable. The FCI was developed from a facilities condition assessment (FCA) conducted by ISES Corporation in 1998 and continually updated by university staff. The university has alternate methods of determining building and campus FCI, one being a life-cycle assessment of major building components through a program and software developed by The Pacific Partners Group. The ISES FCI was

**RESULTS**

**TABLE 1.**

**CHARACTERISTICS OF RESPONDENTS**

	NUMBER	PERCENT
<b>TOTAL RESPONDING</b>	159	100%
<b>POSITION</b>		
Staff	59	37.1
Faculty	95	59.7
Administrator	5	3.2
<b>YEARS ON CAMPUS</b>		
1-4	45	28.3
5-10	55	34.6
11+	59	37.1

chosen as the comparative measurement as it is generally accepted as a more thorough assessment of the actual buildings condition rather than a budget model found in the Pacific Partners format.

After approval from the campus Institutional Research Board (IRB), a direct mail survey was sent to 547 building occupants from seven major buildings on campus. A return rate of 29 percent (n = 159) was realized. The satisfaction data was assembled and compared to the buildings FCI.

**TABLE 2.**

**FACILITIES MANAGER'S RATINGS OF BUILDINGS**

BUILDING	FCI SCORE	RANK
5	.08	1
85	.09	2
56	.26	3
22	.26	4
39	.32	5
46	.38	6
37	.40	7

**TABLE 3.**

**OVERALL USER SATISFACTION WITH ASPECTS OF CAMPUS BUILDINGS**

QUESTION	SUBJECT	SCORE	RANK
20	Campus grounds around the building	4.103	1
6	Interior doors	3.944	2
21	Sidewalks around the building	3.938	3
18	Fire alarm	3.891	4
19	Telephone system	3.852	5
4	Building exterior	3.829	6
5	Entrance doors	3.823	7
9	Electrical system	3.746	8
14	Classroom chalkboard	3.667	9
11	Lighting	3.648	10
22	Overall look and function of the building	3.643	11
17	Elevator	3.572	12
15	Built-in cabinets	3.346	13
12	Classroom audio-visual equipment	3.289	14
7	Interior paint	3.238	15
8	Restroom fixtures	3.232	16
13	Window blinds	3.164	17
16	Laboratories	2.975	18
10	HVAC system	2.523	19

*Continued on page 65*



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TABLE 4.

## DIFFERENCES IN USER SATISFACTION BY BUILDING AND ASPECT

Q#	BUILDING						
	#5	#22	#37	#39	#46	#56	#85
4	3.875	3.82	3.28	3.45	3.96	3.95	4.17
5*	3.375	4.08	3.0	3.875	3.52	4.05	4.25
6*	4.125	3.86	3.7	3.54	3.96	4.13	4.17
7	2.812	3.47	3.1	2.71	3.37	3.50	3.33
8*	3.812	3.65	3.0	2.78	2.67	3.26	3.83
9*	3.625	4.22	4.0	3.22	3.89	3.61	4.0
10*	2.500	1.86	1.42	2.375	2.40	3.18	2.92
11*	3.125	4.08	3.28	2.83	3.59	4.16	3.82
12	3.670	3.61	3.75	2.95	2.92	3.32	3.6
13*	3.670	2.90	2.14	2.45	2.92	3.82	4.0
14*	3.875	3.50	3.50	2.91	3.95	4.0	3.875
15	3.300	3.17	3.14	2.89	3.29	3.71	3.67
16	3.000	3.00	3.25	2.44	3.0	3.25	-
17	4.000	3.4	-	3.38	3.875	3.51	3.08
18*	3.270	4.1	4.5	3.78	3.79	4.03	4.0
19*	4.130	4.13	4.0	3.27	3.96	3.76	4.0
20	3.875	4.18	4.28	4.04	4.07	4.18	4.08
21	3.625	3.69	4.14	4.08	4.07	3.97	1.0
22*	3.560	3.95	3.28	2.83	3.62	3.97	4.09

\*Differences in ratings of buildings on this question are statistically significant,  $p < .05$   
 Shaded box shows building with highest rating on each question

Differences between faculty and staff on each question (all buildings combined) were statistically significant for questions 7, 8, 11, 15, and 22 (results not shown).

Differences between faculty and staff on each question by building were statistically significant only in a few cases.

### Final Analysis

Does the user satisfaction questionnaire closely approximate the FCI building score?

- 1) An evaluation (using the alpha test) of the questions on the questionnaire directly related to building satisfaction shows that the questions are moderately related to one

another. If questions 4 through 22 are combined into a building satisfaction scale, the alpha score = .8114. However, question 10 does not fit in well with the other questions.

- 2) Subsets of questions were combined to form scales more specifically related only to classroom items (questions 12, 14, and 16); building interiors (questions 5, 6, 7, 8, 9, 10, 11, 13, 15, 17, 18, and 19); building exteriors (questions 4, 20, and 21); building functioning (questions 8, 9, 10, 11, 17, 18, and 19).

However, the alpha scores for these items were lower than for the entire set of items, in the .5 to .7 range, which is considered rather low.

- 3) A test for the existence of a relationship with between the FCI score and individual items on the questionnaire using Pearson's r (correlation coefficient) showed a statistically significant relationship with questions 5, 17, and 22 only (with  $p < .05$ ).
- 4) Finally, taking question 22 alone, as an overall indicator of user satisfaction with a building, there is a statistically significant relationship between the building's score on question 22 and the building's FCI score. A t-test for two samples with unequal variance was statistically significant at better than  $p < .05$ .

### Facility Condition Index Study Conclusion

This study is an attempt to add credence to the Facility Condition Index (FCI) methodology by statistically connecting the building user's perception and opinions, to the numerical calculation of the FCI. As evidence by a question in this study ("Overall, the building being rated looks and functions as designed"), in relation to the building FCI, there is a statistically relevant relationship to the satisfaction of the occupants to that building's FCI. This is a small step in scientifically establishing the connection

between faculty and staff's ability to function effectively and what facilities managers claim to be the funding needs.

This relationship is important to establish in order to demonstrate to non-facilities individuals that the FCI measurement isn't a ploy or meaningless calculation to obtain more funding by facilities managers, but has a direct relation on the delivery of the educational product and the satisfaction of the users of those facilities. With that in mind, facilities managers may have a better chance of utilizing the FCI calculation to a wider audience (from legislators to budget committees) when requesting funding and /or establishing priorities for limited resources.

Finally, the Facilities Condition Index would gain further credibility by more stringent and universal standards for the development of this index.

**TABLE 5.**  
**FACULTY/STAFF DIFFERENCES**  
**IN BUILDING SATISFACTION**

	STAFF	FACULTY	SIGNIFICANCE LEVEL
<b>BUILDING 5</b>			
Q10	4.000	2.285	$p < .0843$
Q13	2.500	3.846	$p < .0438$
<b>BUILDING 37</b>			
Q4	4.000	2.75	$p < .0784$
Q14	2.500	4.000	$p < .0936$
<b>BUILDING 39</b>			
Q4	4.250	3.333	$p < .0608$
Q8	3.750	2.578	$p < .0664$
Q15	4.500	2.705	$p < .0324$
Q19	4.333	3.105	$p < .0414$
<b>BUILDING 46</b>			
Q7	4.000	3.105	$p < .0843$
Q8	3.667	2.368	$p < .0316$
Q9	4.500	3.736	$p < .0285$
<b>BUILDING 85</b>			
Q12	3.000	3.857	$p < .0713$

### References

- APPA. *The Strategic Assessment Model, second edition*. APPA: Alexandria, Virginia, 2001.
- Brown, Mark G. *Keeping Score/Using the Right Metrics to Drive World-Class Performance*. New York: Productivity Press, 1996.
- Berman, M.E. *Essential Statistics for Public Managers and Policy Analysts*. Washington, D.C.: CQ Press, 2002.
- Briselden, D.J. and D.A. Cain. The Facilities Condition Index: A Useful Tool for Capital Asset Planning. *Facilities Manager*, volume 17, number 4, July/August 2001.
- Cain, D.A. Benchmarking the FCI at Illinois State's Residential Life. *Facilities Manager*, volume 14, number 3, May/June 1998.

## There is a statistically relevant relationship to the satisfaction of the occupants to that building's FCI.

Kaiser, H.H. *A Foundation to Uphold: A Study of Facilities Conditions at U.S. Colleges and Universities*. A collaboration of APPA and the National Association of College and University Business Officers, with assistance from Sallie Mae. Alexandria, Virginia: APPA, 1996.

Kaplan, R.S. and D.P. Norton. *The Balanced Scorecard*. Boston: Harvard Business School Press, 1996.

King, S.C. and C. Stivers. *Government Is Us, Public Administration in an Anti-Government Era*. Thousand Oaks, California: Sage Publications, 1998.

Office of the President, National Performance Review. *From Red Tape to Results: Creating a Government that Works Better and Costs Less*. Washington, D.C.: Government Printing Office, 1993.

Osborn, D. and T. Gaebler. *Reinventing Government*. Reading, Massachusetts: Addison-Wesley, 1992.

O'Sullivan, E., G.R. Rassel, and M. Berner. *Research Methods for Public Administrators, fourth edition*. New York: Addison Wesley Longman, Inc., 2003.

### Appendix I: Survey

This short survey (see pages 68-69) is for the purpose of assessing your satisfaction with the function and appearance of a specific CSULB facility. The responses received will be tabulated and compared with the relative condition of that facility as described by the Facilities Condition Index (FCI). The FCI is a ratio of the identified deficiencies or deferred maintenance (DM) of a building (excluding equipment such as microscopes or machinery) and the Current Replacement Value (CRV) of that building. Simply stated as the  $FCI = DM / CRV$ . This survey is part of my masters program in Public Policy and Administration and not in relation to my role as Director of Facilities Management. If you elect to participate, it is important that you answer the questions in a manner that best represents your opinion/satisfaction of the **specific building** that you are reporting on.

Your answers will be kept confidential and will only be reported as part of a larger report. Individual's information will be kept confidential at all times and once aggregated, will be destroyed. The purpose of this research project is to determine if a correlation exists between the FCI and the end users satisfaction with the facilities. Your participation in any or all of these questions is strictly voluntary.

Thank you for participating in this important study. Copies of this study may be published in a future issue of the trade journal, *Facilities Manager*. I will share the results of this study with any interested party upon request. 🏊

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**Please circle your best answer or fill in the blank:**

- 1) I am:      a) Faculty      b) Staff      c) Other
- 2) I have been at CSULB for \_\_\_ years.
- 3) **State the name of the building you are rating:** \_\_\_\_\_
- 4) The building exterior appear to be well maintained:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 5) The building entrance doors and hardware function properly:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 6) The building interior doors and hardware function properly:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 7) The building's interior is adequately painted:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 8) The building's restroom fixtures (sinks, toilets, partitions) function properly:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 9) The building electrical system is reliable:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 10) The building Heating, Ventilation, and Air Conditioning function properly:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 11) The building lighting functions properly:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 12) The classroom audio-visual systems function properly:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 13) The window blinds function properly:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 14) The chalkboards and whiteboards function properly:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 15) The built-in cabinets are in good repair:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 16) The building laboratories function properly (fume hoods, utility valves, etc.):  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 17) The building elevators function properly:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 18) The building fire alarm system functions properly:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 19) The building phone system functions properly:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 20) The campus grounds are adequately maintained:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable
- 21) The campus sidewalks are adequately maintained:  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree      Not Applicable

22) The campus roads are adequately maintained:

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree    Not Applicable

23) Overall, the building being rated looks and functions as designed:

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree    Not Applicable

**Thank you again for taking the time to fill out this survey. Your response will be kept confidential except as aggregated with the building summary.**

SUMMARY							
Bldg #	Name	FCI	Avg		Dist	Returned	Return %
			Sat	Dist			
5	FCS	0.08	3.54	48	16	33.33%	
85	CBA	0.09	3.90	112	19	16.96%	
56	ET	0.26	3.76	64	38	59.38%	
22	ED-1	0.26	3.62	102	23	22.55%	
39	FA-4	0.32	3.16	60	25	41.67%	
46	SS/PA	0.38	3.52	96	28	29.17%	
37	PH-1	0.4	3.15	65	10	15.38%	
All				547	159	29.06%	
<b>AVG</b>		<b>0.26</b>	<b>3.52</b>	<b>78</b>	<b>23</b>	<b>31.21%</b>	

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