Current Replacement Value – The Forgotten Half of the FCI

A White Paper By William Roth

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This white paper focuses on Current Replacement Value (CRV) and its importance in allowing organizations to benchmark their portfolios using Facility Condition Indices (FCIs). While there are other methodologies that organizations have used, this paper will highlight the four most common based on our experience.

Many organizations struggle to develop a consistent, defensible, and stable methodology for calculating the Current Replacement Value (CRV) for the buildings within their portfolio. They tend to focus on a clear understanding of their Renewal Needs (numerator of the Facility Condition Index (FCI) calculation – see below) as the denominator of the calculation CRV has an equal impact on an organization's ability to use and leverage FCIs.

$$\text{FCI} = \frac{\text{Sum or Renewal Needs in each Period of Time}}{\text{Current Replacement Value}} \times 100$$

The most crucial factor that organizations should focus on is to be consistent in how they calculate FCI. In fact, within a single portfolio, it is more important to be consistent than accurate.

CRVs that are lower than "real world" replacement costs will result in artificially higher FCIs, and the opposite is also true. However, within your portfolio, if all your CRVs are consistently low, you can still use FCI as a benchmark for comparison since they are all "off" by the same amount.

An issue could arise if you try to compare your information to another organization that uses a different methodology for CRV calculation. In that case your artificially high FCIs would not be comparable.

Calculating Current Replacement Values – Insurable Value Method

This is a single, common methodology that some organizations use to calculate CRV.

To secure an insurance policy on any building the insurer will ask for an Insurable Value (IV) for a building. The insurance company is looking for a valuation of the building that it will pay out in the event of complete loss associated with a policy.

Nearly every organization has IV calculations for all their buildings (as well as other insurable assets). This readily available data, which is already being used in other areas of the business can be an easy-to-use baseline for CRVs.

However, there are a few key things that must be clearly understood before IV should be considered as the basis for CRVs.

In my experience, organizations have often been using the same IVs for an exceedingly long time, sometime for decades (adjusted annually for inflation). As such, the original method used to calculate the IVs may not be known. We recommend that before you use IVs as CRVs that you have a clear understanding of the original methodology used to calculate the IVs.

IVs are developed by integrating the building elements with an industry standard cost guideline such as Marshall and Swift. However, if the building was constructed many years ago, it may not be clear how the IVs was originally calculated.

Additionally, for organizations that have buildings that were built over many years or decades, it is important that the methodology used to develop the IVs for the buildings built over time is consistent. If the methodology changes over time, then inconsistency can creep into the process and create issues associated with comparing FCIs.

For several of our Roth IAMS clients, particularly those that have significant diversity in building type/use, we have used IV as the CRVs. However, we always recommend that some secondary cross-checking is done to make sure that there is sufficient consistency in the values. This can include comparing cost per square footage for buildings of a similar type, or comparing with actual construction costs of similar, recently constructed buildings.

Simple Square Footage Cost Method

CRV represents the denominator of the calculation for Facility Condition Index, and as such is critical for providing a consistent means of accurately benchmarking the condition of your buildings across a portfolio.

One of the most common methods for calculating CRV for clients with similar types of buildings, located in a similar geographic area is the use the SSF methodology. This method works best if you have numerous buildings located within a limited geographical footprint, ideally built to similar construction standards, within a portfolio.

For example, if a Municipality has seven Fire Halls, all built to similar specifications, then determining a base cost/sq.ft. construction cost can be an efficient and effective way to get a consistent CRV. Each unique asset type (e.g., Library, Works Building, Elementary School, etc.) can be assigned a base cost/sq. ft value. The SSF CRV is calculated by multiplying the building Square Footage by the base cost/sq.ft.

Table 1 below provides sample calculations for three buildings (please note the base Cost/sq.ft. presented are just for the purposes of calculation and do not represent recommended construction costs).

Table 1 – Simple Square Footage CRV Calculations			
Building	**Size (sq.ft.)**	**Base Cost/sq.ft.**	**CRV**
Fire Hall #1	4,500	$310	$1,395,000
Fire Hall #2	6,250	$310	$1,937,500
Library #1	5,725	$400	$2,290,000

The most crucial factor within this methodology is the accuracy of the base cost/sq.ft value developed for each building type/category. The data from recent construction may also be used to benchmark the base cost/sq.ft. value. However, it should be noted that the market trends (supply and demand, competition, etc.) may influence the base cost/sq. ft value. To avoid market trends and be consistent, we recommend that recognized cost guidelines, such as Marshall & Swift Valuation Services, RS Means, etc. be used to determine the base cost/sq.ft. construction cost.

An accurate understanding of the size of your building portfolio is also obviously extremely critical to this methodology. In our experience, most clients have a reasonable understanding of the square footage of their buildings. However, this is information that can be verified during a Building Condition Assessment (BCA), which is how the Deferred Capital Renewal and Maintenance (DCRM) is determined, which is the numerator of the FCI calculation.

One of the biggest advantages to this method is it is easy to explain to stakeholders, even those that do not have a Facilities or Asset Management background. Additionally, if your building measurements are accurate, it is a very consistent method for calculating CRV.

If your portfolio has a high degree of variation in construction type, building systems, and construction year, the SSF method may not reflect and accurate CRV.

For example, if you manage a School Board/Division/District that has some simple schools with limited ventilation and no air conditioning, and some other schools that have these features/systems, depending on how you select your Square Footage Cost, you will either overvalue the simple buildings (if you pick a unit cost that is closer to the more complex schools) or undervalue your more complex buildings (if you pick a unit cost that is closer to the simpler schools). In this case, the comparability of your FCIs will be impacted.

CRV – Sum of the Parts Method

The idea behind the “Sum of the Parts” (SotP) methodology is that as part of a Facility Condition Assessment (FCA), the replacement cost of each element within a building is calculated. Therefore, the CRV for the building is based on the sum of all Element Replacement Values (ERVs)

CRV = Sum of all ERVs for a building

This methodology has gained popularity due to several commercially available Capital Asset Management Systems (CAMS) using this as the foundation for how CRVs are calculated.

In many cases FCAs may not inventory all the Elements within a building and therefore a complete list of ERVs may not be available. However, this is easily overcome by updating your Terms of Reference for your FCAs to include a detailed element-level inventory, including calculation of ERV.

Using the SotP methodology works when there is a high-level of consistency in the FCA methodology and how the ERVs are calculated across the entire portfolio.

If an Element is missed in an FCA then the CRV will be artificially low. If an element in one building is costed too high or low in one building, or by one assessor or assessment firm across multiple buildings, the comparability of FCIs will be impacted due to the lack of consistency.

The other challenge with the SotP methodology is that the CRV can change materially from one FCA to the next, especially if you are collaborating with a different firm (that may use a different costing methodology), or you adjust your scope of work between assessments. This can result in a material change in your FCIs, not based on anything that you and your team have done (invested additional moneys or deferred needs) but based on a change in the way you calculate your CRV.

In general, most organizations that we collaborate with prefer to have a stable CRV so that changes in the FCI over time is based more on the capital renewal need (the numerator) as opposed to the CRV.

As one of the most common methodologies for calculating CRVs, SotP provides an easy-to-understand methodology. However, organizations must be diligent in ensuring the consistency and stability of the calculation over time.

Weighted Square Footage Cost

The last approach, which is a modification on the SSF, we call Weighted Square Footage (WSF) Cost. The SSF methodology applies a single cost/sq.ft. to each building to get the CRV. While this works for single purpose building, not all buildings or portfolios are that simple.

In cases where you have multipurpose buildings that have different uses in different areas of a building, it is difficult to develop a single cost/sq.ft. that is relevant for the entire building, without having to model each building individually, which is very labour intensive.

For example, within the higher education sector, there are very few single-use buildings. Most on-campus buildings have a combination of classrooms, offices, laboratories, and other special purpose spaces. The proportion of each space type varies from building to building.

Another example might be a recreation centre where there is a pool, an arena, and a gym as well as a police or fire station. Each of these spaces has quite a different cost/sq.ft. profile.

To address these varied program spaces, we recommend that you develop unit costs for each space type that are then applied based on the total size of each space use.

Table 1 below provides an example of a simple WSF calculation. Please note the costs provided are purely for demonstration purposes.

Table 1 – Weighted Square Footage CRV Calculation

Building	Space Type	Cost/sq. ft	Square Footage	Weighted Cost
Science Building	Classroom	$350	20,000	$7,000,000
	Laboratory	$500	15,000	$7,500,000
	Administration	$300	10,000	$3,000,000
	Library	$375	30,000	$11,250,000
Current Replacement Value				**$28,750,000**

Like the SSF methodology, getting accurate square footage costing for each space type is vital. Once again, cost guides such as Marshall & Swift and R.S. Mean can be used as a baseline for these values. Cost guides provide average values for a given market. As such, we recommend that you validate the costs based on actual construction costs for your organization or within your sector.

The second critical data point is a clear understanding of the square footage for each space type. If you have accurate space data, such as with the Higher Education institution across Canada, then this methodology can be straight forward to implement. If you do not have accurate data, the CRVs may be impacted by poor square footage information for each space type. We highly recommend that clients who are going to use this methodology conduct regular measurements of the space usage within their facilities to ensure accuracy over time for their WSF CRVs.

The only time that a major change to a building's CRV would occur with this method is if there is a major reprogramming of the space usage of the facility, such as if a number of classrooms are converted to laboratories. In this case the CRV would go up, based on the higher cost/sq.ft. for laboratory space compared to classrooms. This increase makes perfect sense and is easy to explain to Boards, Senior Leadership, and other non-facility professionals.

Factoring Factors into your Current Replacement Value

Factoring involves applying a multiplier to the base CRV calculation to address differences between assets and can be applied to any of the methods discussed in this paper.

The most important thing to remember about any factor (multiplier) applied to your data is that it must be applied consistently to both the CRV calculation as well as the Deferred Capital Renewal & Maintenance (DCRM) needs so that it does not impact the Facility Condition Index (FCI).

Following is a few of the most common factors that are applied to CRV calculations.

Regional Factors

For clients with a portfolio that has a broad geographic footprint, there are material differences in construction costs from one market to another. For example, costs in Toronto are going to be different than costs in Saskatoon or New York.

For clients with robust data, they may be able to develop their own customized regional factors that reflect their real-world reality. For clients that do not have sufficient recent construction data across their various regions, cost guides such as Marshall & Swift, R.S. Means and others can provide industry average values.

As discussed before when looking at industry cost guides, it is important to understand how robust the dataset used by the cost guide was for the regions in which you operate. If you are operating in major urban centres, the data is statistically valid. However, if you are in secondary or tertiary markets, the dataset used may be very small.

Sector-Based Factors

When relying on values derived from industry standard cost guides, some clients have applied a sector-based multiplier to their CRV.

As an example, School Boards/Districts/Divisions try to schedule most of their construction and renewal activity within the summer months to minimize disruption to school activities. As a result, costs may be elevated in certain markets because of the limited construction season.

Additionally, for organizations that participate in Collective Bargaining, there are sometimes additional costs that are incurred as a result.

In each of these cases, adding consistent factors to the CRV calculation will make the values more reflective of the organizational reality.

Soft Cost Factors

Typical Facility Condition Assessment (FCA) data represents a replace-in-kind scenario, as well as represents construction costs only. However, in the real world there are soft costs (Design, Project Management, Contingency, etc.).

To address these costs most of our clients apply a soft cost factor to their data. The scale of the factor varies between clients. We have seen values ranging from 20% to 85% applied for soft costs

Complexity Factors

Certain buildings may have unique elements or conditions that mean that they have higher than normal costs, even when compared within a portfolio.

For example, a legislature building may include extremely high-end finishes that make the replacement cost outsized compared to other buildings within a Provincial portfolio. A certain type of building envelope installed may have a much higher cost than normal and was selected for a “landmark” type building.

Heritage considerations are also another type of complexity factor that we often see applied. For specific elements within a heritage or historical building, additional costs are required for repairs/restoration. In many cases replacement is taken off the table entirely for these elements, so inherently costs for restoration is much higher than a simple replacement.

Central Utility Connection

For campus-based organizations, one area that gets overlooked when it comes to CRVs is whether the building is connected to a Central Utility or Plant building. In general, buildings that are part of a Central Utility network do not have HVAC equipment within them as the service is provided from the Central Plant facility. As such, the overall CRV for that building should be reduced to reflect the fact that there is limited HVAC equipment within the building.

A Note on Central Plant Buildings

Central Plant Buildings themselves also provide a unique situation that must be addressed. Different sized campuses have different sized equipment. Therefore, it is difficult to develop a unit cost for a standard Central Plant Building.

The base cost for the plant building can be developed using a standard unit cost. However, the costs associated with the Generation equipment should reflect the actual costs for the equipment. This makes the Central Plant building a bit of an outlier for any of the recommended methodologies. Given the complexity, the unique nature, and the significant costs associated with the generation equipment, we feel they warrant special attention

Closing Comments on Factors

Although we have presented a wide range of potential factors for consideration, we recommend that clients use the fewest number of factors that they can, and still get representative CRV values for their assets. The more factors you use, the harder it is to apply them consistently, and the more difficult it is to explain where your CRVs come from.

The most important thing about CRV calculation is that it is consistent. Too many factors, or factors applied inconsistently can damage what would otherwise be a successful CRV methodology.