



**Canadian  
Institute  
of Actuaries**

**Institut  
canadien  
des actuaires**

## **EDUCATIONAL NOTE**

# **Calculation of Incremental Cost on a Hypothetical Wind- Up or Solvency Basis**

April 2023



# Calculation of Incremental Cost on a Hypothetical Wind-Up or Solvency Basis

## Document 223065

*Ce document est disponible en français.*

The actuary should be familiar with relevant educational notes. Educational notes are not binding; rather they are intended to illustrate the application of the standards of practice. A practice that an educational note describes for a situation is not necessarily the only accepted practice for that situation nor is it necessarily accepted practice for a different situation. Responsibility for ensuring that work is in accordance with accepted actuarial practice lies with the actuary. As accepted actuarial practice evolves, an educational note may no longer appropriately illustrate the application of standards. To assist the actuary, the CIA website contains a reference of pending changes to educational notes.

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## Preamble

The current *Standards of Practice* require, with limited exceptions, an external user report on the funded status or funding of a pension plan to report the incremental cost on a hypothetical wind-up or solvency basis. This educational note is intended to assist actuaries in the calculation of a pension plan's incremental cost on a hypothetical wind-up or solvency basis.

An educational note on the same subject was originally issued on December 21, 2010. This educational note is an update to the prior educational note in light of the recent quinquennial review and update of the pension-specific standards of practice (Part 3000).

## Process

The creation of this cover letter and educational note has followed the Actuarial Guidance Council's (AGC's) protocol for the adoption of educational notes. In accordance with the CIA's *Policy on Due Process for the Approval of Guidance Material Other Than Standards of Practice and Research Documents*, this educational note has been prepared by the Committee on Pension Plan Financial Reporting (PPFRC) and has received final approval for distribution by the AGC on April 11, 2023.

## Responsibility of the actuary

The actuary should be familiar with relevant educational notes. Educational notes are not binding; rather they are intended to illustrate the application of the standards of practice. A practice that an educational note describes for a situation is not necessarily the only accepted practice for that situation nor is it necessarily accepted practice for a different situation. Responsibility for ensuring that work is in accordance with accepted actuarial practice lies with the actuary. As accepted actuarial practice evolves, an educational note may no longer appropriately illustrate the application of standards. To assist the actuary, the CIA website contains a reference of pending changes to educational notes.

## Your feedback

Questions or comments regarding this educational note may be directed to the [chair of the PPFRC](#).

## 1. Introduction

The *Standards of Practice* requires that, with limited exceptions, an external user report on the funded status or funding of a pension plan, which includes a hypothetical wind-up or solvency valuation, will include an incremental cost calculated on a hypothetical wind-up or solvency basis. This educational note provides guidance for actuaries on the calculation of the incremental cost on a hypothetical wind-up or solvency basis.

The Practice-Specific Standards for Pension Plans (effective December 1, 2022) include the following reference to incremental cost on a hypothetical wind-up or solvency basis,

3260.08

If an external user report includes one or more hypothetical wind-up valuations or solvency valuations then, for any one such hypothetical wind-up valuation or solvency valuation, the external user report should:

- report the incremental cost between the calculation date and the next calculation date, in respect of the defined benefit portion of the plan;

...

## Incremental cost

The incremental cost on a hypothetical wind-up or solvency basis represents the present value, at the calculation date (time 0), of the expected aggregate change in the hypothetical wind-up or solvency liability between time 0 and the next calculation date (time t), adjusted upwards for expected benefit payments between time 0 and time t.

## Calculation methodology

One methodology of calculating the incremental cost on a hypothetical wind-up or solvency basis, determined at time 0 and covering the period to time t, is

the present value at time 0 of expected benefit payments between time 0 and time t, discounted to time 0,

plus

a projected hypothetical wind-up or solvency liability at time t, discounted to time 0, allowing for, if applicable to the pension plan being valued,

expected decrements and related changes in membership status between time 0 and time t,

accrual of service to time t,

expected changes in benefits to time t (e.g., increases in a flat dollar pension formula, or increases in the maximum pension limits of the Income Tax Act), and

a projection of pensionable earnings to time t,

less

the hypothetical wind-up or solvency liability at time 0.

## Assumptions

The assumptions for the expected benefit payments in the first element and decrement probabilities, service accruals, and projected changes in benefits and/or pensionable earnings in the second element would be consistent with the assumptions used in the pension plan's going concern valuation between time 0 and time t, if such a valuation were to be conducted as of time 0. Alternatively, if the actuary considers such experience to be different from the longer term expected experience assumed for a going concern valuation, the actuary may reflect expected experience between time 0 and time t.

The assumptions used to calculate the projected liability at time t in the second element would generally be consistent with the assumptions for the hypothetical wind-up or solvency liability at time 0, assuming that interest rates remain at the levels applicable at time 0, that the select period is reset at time t for interest rate assumptions that are select and ultimate (e.g., at time t the select period would be reset to 10 years for interest rates established in accordance with the *Standards of Practice* for the calculation of commuted values) and that the *Standards of Practice* for the calculation of commuted values and the guidance for estimated annuity purchase costs in effect at time 0 remain in effect at time t.

The interest rate to be used to discount from time t to time 0 for both the first and second elements would be the interest rate used to determine the hypothetical wind-up or solvency liability at time 0. However, if this rate is a real interest rate (net of inflation), use of a corresponding nominal interest rate would be appropriate. Where there is more than one interest rate used for the hypothetical wind-up or solvency liability of a member at time 0 (e.g., because there are probabilities assigned to the method of

settlement), the projected liability would be split into these same components and discounted to time 0 using the interest rate inherent in each component.

### **Additional considerations**

Active and inactive plan members as of time 0 and assumed new entrants over the period between time 0 and time t would generally be considered in calculating the incremental cost. For active members, projected hypothetical wind-up or solvency benefits at time t would reflect the value of a deferred or immediate pension to which a member is expected to be entitled based on the assumed probabilities of termination or retirement between time 0 and time t.

In certain circumstances, a non-zero incremental cost could be generated for inactive plan members. For example, an expected change between time 0 and time t in the benefits provided to inactive members that is not reflected in the liability at time 0 (e.g., a scheduled increase in the monthly pensions of retired members) would generally result in a non-zero incremental cost for the inactive plan members.

The projected hypothetical wind-up or solvency liability at time t would be calculated using the same postulated scenario of the circumstances of the hypothetical wind-up or plan termination as is used for the hypothetical wind-up or solvency valuation at time 0.

The incremental cost would include the effect of a pending amendment to the pension plan, consistent with paragraph 3210.19 of the *Standards of Practice*.

The incremental cost would allow for the expected changes in benefits due to factors such as members becoming eligible for early retirement “grow-in” benefits, or members becoming eligible for unreduced or subsidized early retirement benefits, where such factors would result in a significant increase in the hypothetical wind-up or solvency liability between time 0 and time t.

Where the interest rate(s) that would be used to value the projected hypothetical wind-up or solvency liability for a particular member at time t would be different from the interest rate(s) used at time 0 (e.g., because the probability of method of settlement is expected to be different at time t than it was at time 0, or because smoothed interest rates are being used), the actuary would account for the change in interest rates. In relation to the smoothing of interest rates, it would be appropriate to assume that the unsmoothed interest rates at time t remain at the same levels applicable at time 0.

The incremental cost would not be affected by the expected return on the pension plan’s assets.

### **Incremental cost versus service cost**

The incremental cost calculated on a hypothetical wind-up or solvency basis and the service cost calculated for a going concern valuation usually represent fundamentally different measures, depending on the methods being used. Typical differences between the incremental cost and service cost include the following:

The service cost generally represents the expected change in liability between time 0 and time t due to service rendered during the period. The incremental cost, however, represents the expected change in liability due to all factors, other than expected benefit payments. For example, the incremental cost would generally include the present value at time 0 of the total liability at time t associated with expected changes in benefits between time 0 and time t. The service cost would generally only include the portion of the liability associated with expected changes in benefits that is in respect of service rendered between time 0 and time t.

The interest rate used to calculate the service cost may reflect the expected return on the pension plan’s assets, while the incremental cost calculation is independent of the expected return on plan assets.

Because of these differences, in many circumstances the incremental cost may not be an appropriate measure of the contributions that would be required to fund a plan on a hypothetical wind-up or solvency basis between time 0 and time t.

Depending on the circumstances of the work, the terms of an appropriate engagement may specify that the actuary disclose a cost that is appropriate to fund a plan on a hypothetical wind-up or solvency basis. In such circumstances and subject to applicable law, the actuary would consider adjustments to the incremental cost including, but not limited to

- excluding the cost of expected changes in benefits between time 0 and time t to the extent that the funding for the cost of these benefit changes is to be deferred and amortized over time, and

- off-setting the incremental cost to adjust for the difference between

  - the expected return on plan assets between time 0 and time t based on the going concern interest rate, and

  - the return on plan assets over that period implied by the hypothetical wind-up or solvency valuation interest rate(s).

### **Approximations**

Considering materiality and subsection 1410 of the *Standards of Practice*, approximations may be used, among others, in respect of

- if the method of settlement is expected to be different at time t than it was at time 0, the projected hypothetical wind-up or solvency liability for a member could be valued based on the settlement method at time 0, with discounting of the liability using the corresponding interest rate(s),

- if the solvency basis includes smoothing of interest rates, the projected solvency liability could be valued using the same smoothed interest rates applicable at time 0,

- decrements and/or assumed new entrants between time 0 and time t could be ignored, and

- the projected hypothetical wind-up or solvency liability at time t, discounted to time 0, could be calculated at time 0, but using the data expected at time t.

### **Other approaches**

Other methods may be appropriate if they produce an incremental cost that reasonably reflects the present value of the expected aggregate change in the hypothetical wind-up or solvency liability between time 0 and time t, adjusted for expected benefit payments between time 0 and time t.



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