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Educational Note

2015 Guidance to the Appointed Actuary for Property and Casualty Insurers

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2015 Guidance to the Appointed Actuary for Property and Casualty Insurers

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**Committee on Property and Casualty
Insurance Financial Reporting**

October 2015

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Members should be familiar with educational notes. Educational notes describe but do not recommend practice in illustrative situations. They do not constitute standards of practice and are, therefore, not binding. They are, however, intended to illustrate the application (but not necessarily the only application) of the Standards of Practice, so there should be no conflict between them. They are intended to assist actuaries in applying standards of practice in respect of specific matters. Responsibility for the manner of application of standards of practice in specific circumstances remains that of the members.

MEMORANDUM

To: Members in the Property and Casualty Insurance Practice Area

From: Pierre Dionne, Chair
Practice Council
Julie-Linda Laforce, Chair
Committee on Property and Casualty Insurance Financial Reporting

Date: October 16, 2015

Subject: **Educational Note – 2015 Guidance to the Appointed Actuary for Property and Casualty Insurers**

In accordance with the Canadian Institute of Actuaries' Policy on Due Process for the Approval of Guidance Material Other than Standards of Practice, this educational note has been prepared by the Committee on Property and Casualty Insurance Financial Reporting, and has received final approval for distribution by the Practice Council on October 13, 2015.

As outlined in subsection 1220 of the Standards of Practice, "*The actuary should be familiar with relevant Educational Notes and other designated educational material.*" That subsection explains further that a "practice that the Educational Notes describe for a situation is not necessarily the only accepted practice for that situation and is not necessarily accepted actuarial practice for a different situation." As well, "Educational Notes are intended to illustrate the application (but not necessarily the only application) of the standards, so there should be no conflict between them."

If you have any questions or comments regarding this educational note, please contact Julie-Linda Laforce at julielindalaforce@axxima.ca.

PD, JLL

Introduction

The Committee on Property and Casualty Insurance Financial Reporting (PCFRC) of the Canadian Institute of Actuaries (CIA) prepared this educational note to provide guidance to the Appointed Actuary (AA) for property and casualty (P&C) insurers. This note reviews relevant standards of practice and educational notes and discusses current issues affecting the work of the AA. Links to all the CIA documents referenced in this educational note are provided in appendix A.

Standards of Practice

While all of the [rules of professional conduct](#) and [standards of practice](#) are important, your attention is directed to the following that are particularly relevant for AAs:

- Subsection 1340 – Materiality;
- Section 1500 – The Work;
- Section 1600 – Another Person’s Work;
- Section 1700 – Assumptions;
- Section 1800 – Reporting;
- Section 2100 – Insurance Contract Valuation: All Insurance;
- Section 2200 – Insurance Contract Valuation: Property and Casualty Insurance;
- Section 2400 – The Appointed Actuary; and
- Section 2500 – Dynamic Capital Adequacy Testing.

The standards are subject to revision from time to time. For information about these revisions, please refer to the CIA website.

Materiality

Materiality is addressed in [subsection 1340 of the standards](#). As stated in paragraph 1340.02, “Judgment about materiality pervades virtually all work”. The AA would communicate with the external auditor regarding materiality in accordance with the CIA/CICA Joint Policy Statement ([subsection 1630](#)).

The AA would consider the users of the report when selecting the level of materiality. For the Appointed Actuary Report (AAR), the end users are not limited to the users of the financial statements. The materiality threshold selected by the AA for the valuation of insurance contract liabilities usually would not be greater than the external auditor’s selected materiality threshold. However, it may be substantially less when the actuary considers it appropriate to select a lower threshold. The materiality selected by the AA for the Dynamic Capital Adequacy Testing (DCAT) analysis would usually be greater than the materiality selected for the valuation of insurance contract liabilities.

For further information on materiality, the AA is referred to the [CIA Report on Materiality](#) (2007).

Use of Another Person's Work

[Section 1600 of the Standards of Practice](#) discusses considerations when using another person's work. Paragraph 1610.07 notes that "the actuary may use and take responsibility for another person's work, given confidence that such actions are justified". However, as indicated in paragraph 1610.08, "Failing such confidence, the actuary would not take responsibility for the other person's work." In this situation, the AA may still use another person's work, but, as stated in paragraph 1610.12, "If the actuary uses but does not take responsibility for another person's work, then the actuary would nevertheless examine the other person's work for evident shortcomings and would either report the results of such examination or avoid use of the work."

A particularly relevant example for AAs is the use of industry benchmarks related to Ontario automobile reforms. Similarly, the use of industry benchmark trend factors is another example. When using benchmarks developed by a third party, the AAs would consider the professional requirements set out in section 1600.

Educational Notes and Other CIA Publications

To assist AAs in their fiscal year-end valuation or DCAT work, the following educational notes and documents are valuable sources of information:

- Revised educational note: [Premium Liabilities](#) (March 2015);
- Educational note: [Dynamic Capital Adequacy Testing](#) (November 2013);
- Revised educational note: [Subsequent Events](#) (October 2015);
- Educational note: [Evaluation of the Rolloff of P&C Claims Liabilities when the Liabilities are Discounted in Accordance with Accepted Actuarial Practice](#) (June 2011);
- Educational note: [Discounting](#) (November 2010)¹;
- Research paper: [Disclosure Requirements IFRS 4 – Insurance Contracts for P&C Insurers](#) (October 2010);
- Educational note: [Margins for Adverse Deviations for P&C Insurance](#) (December 2009);
- Educational note: [Accounting for Reinsurance Contracts under International Financial Reporting Standards](#) (December 2009);

¹ The PCFRC released an educational note on discounting, as indicated above. Section 4.2 of that note relates to "Selection of Discount Rate for Estimation of Net Present Value" and includes the following statement: "Unless the asset cash flow is consistent with the liability cash flow, the actuary would consider the effect of reinvesting positive net cash flow, or the effect of the liquidation of assets to address negative net cash flow."

In this context, "consistent" is intended to refer to an asset cash flow that provides sufficient but not excessive funds (through cash and certain receivables, payment of dividends and coupons, maturing values, or liquid assets) in each period to cover the payment of claim and premium liabilities expected to require payment in those periods.

- Educational note: [Classification of Contracts under International Financial Reporting Standards](#) (June 2009);
- [Report of the CIA Task Force on Materiality](#) (October 2007);
- [Report of the CIA Task Force on the Appropriate Treatment of Reinsurance](#) (October 2007);
- Educational note: [Consideration of Future Income Taxes in the Valuation of Policy Liabilities](#) (July 2005); and
- Educational note: [Valuation of Policy Liabilities P&C Insurance Considerations Regarding Claim Liabilities and Premium Liabilities](#) (June 2003).

International Financial Reporting Standards

In June 2013 the International Accounting Standards Board (IASB) published the exposure draft Insurance Contracts for comments.

- IASB – Insurance Contracts, exposure draft, June 2013 and
- IASB – Insurance Contracts, basis for conclusions exposure draft, June 2013.

The final insurance contracts standard is expected to be published after 2015, and the mandatory effective date will be after the effective date of International Financial Reporting Standard 9, or IFRS 9 (Financial Instruments). The IASB is expected to allow adequate time for implementation and will consider whether it would be helpful to allow a longer period after IFRS 9 is mandatorily effective before the new insurance contracts standard must be applied.

Regulatory Guidance

We remind AAs to refer to updated communications from provincial and/or federal insurance regulators regarding insurance contract liabilities valuation and DCAT reporting.

Office of the Superintendent of Financial Institutions Requirements

1. OSFI Annual Memorandum for Actuarial Reports on P&C Business

The [Office of the Superintendent of Financial Institutions](#) (OSFI) issues a [memorandum for the AA](#) on an annual basis. AAs would consult this memorandum for complete instructions from OSFI.

2. Capital Requirements

In this section, references to OSFI's Minimum Capital Test (MCT) for Canadian insurers are intended to encompass comparable requirements for Canadian branches of foreign insurers, i.e., the Branch Adequacy of Assets Test (BAAT).

In September 2014, OSFI released a new [MCT guideline](#) with an effective date of January 1, 2015.

The following changes in the guideline should be noted:

- Revised underlying risk factors for insurance risk that are to be applied to, instead of unearned premiums, premium liabilities net of Provision for Adverse Deviations;

- An explicit risk charge for operational risk;
- An explicit credit for diversification between insurance risk and the sum of credit risk and market risk;
- Removed charge on deferred policy acquisition expense;
- Revisions to capital rules regarding earthquake exposures are integrated within the MCT guideline;
- Charges and factors bring the capital requirement to the supervisory target level (i.e., will be divided by 1.5 for the minimum); and
- Transition phase-in period over 12 quarters.

For the MCT calculated in accordance with the revised guideline, an insurer's premium liabilities must be estimated by annual statement class of insurance, as the risk factors applied to premium liabilities vary by class of business. Certain components of premium liabilities, such as future claim costs, may be estimated by the AA at the level of detail required for MCT purposes, while other components, such as future reinsurance costs and future maintenance costs, are often estimated on an all-lines basis for valuation purposes. The AA would consider revising the derivation of estimated premium liabilities for valuation purposes in order to meet the requirement for an estimate by class of insurance, either deriving such detail directly, or by allocation of estimates derived on a broader basis. In selecting an appropriate approach, the AA would consider the availability of appropriate information, the existence of relevant accounting policies of the insurers, the significance of the amounts to be calculated or allocated, and other relevant information. If appropriate, the AA would consider adopting a similar approach for DCAT purposes.

The combined effect of the changes described in the revised MCT guideline varies significantly from one insurer to another, depending on many factors, including the insurer's corporate structure, the nature of the business written by the insurer, the composition of its capital, and the nature of its reinsurance arrangements.

The MCT guideline requires the calculation of the estimated duration of the insurer's interest-rate-sensitive claim liabilities and premium liabilities. Appendix B presents an illustration of the calculation of these durations.

OSFI issued the [2016 draft MCT guideline](#) in July 2015 with an effective date of January 1, 2016. The draft guideline has no effect on the insurer's MCT ratio at year-end 2016. The AA would consider commenting if the effect of the proposed changes is considered significant for the insurer.

3. Stress Testing

OSFI [Guideline E-18](#) (Stress Testing) states that OSFI may "ask institutions from time to time to carry out standardized scenario tests to assess system-wide vulnerabilities". During 2015, OSFI required certain P&C insurers to undertake specific standardized stress testing, with a deadline of June 30, 2015. Actuaries for P&C insurers not subject to this request are expected to include the standardized stress tests as illustrative scenarios in their next DCAT report, or to comment on why such scenarios are not applicable to the insurer.

The actuary is reminded that the company's performance in previous stress tests can be a useful consideration for the actuary when designing or selecting current-year company-specific scenarios.

4. Guideline A-4 Regulatory Capital and Internal Capital Targets

OSFI [Guideline A-4 Regulatory Capital and Internal Capital Targets](#) was updated effective January 2014. The guideline sets out OSFI's expectations with respect to the setting of insurer-specific target capital ratios and how such targets relate to the assessment of capital adequacy within the context of OSFI's supervisory framework. The AA would usually be involved with and understand the company's process and assumptions used to select the target capital ratio.

5. Guideline E-19 Own Risk and Solvency Assessment

This [guideline](#) came into effect on January 1, 2014. It sets out OSFI's expectations with respect to an insurer's own assessment of its risks, capital needs, and solvency position and for setting internal targets.

AAs would usually be involved in the preparation of the Own Risk and Solvency Assessment (ORSA), considering the significant contribution they have in preparing several elements that are part of ORSA such as DCAT, stress testing as per Guideline E-18, internal capital target setting (Guideline A-4) and the policy liabilities valuation report. AAs may also be involved in the qualitative aspects of ORSA for example assisting in the determination of the risk appetite and risk tolerance of the company. The report has to be reviewed and discussed by the board or the chief agent before December 31 of each year. The key metrics report form should be submitted to OSFI at least annually and within 30 days of being reviewed by the board of directors or signed off by the chief agent.

6. Guideline E-15 Appointed Actuary: Legal Requirements, Qualifications, and Peer Review

A full peer review is required every three years. In addition, OSFI expects the reviewer to undertake a limited annual review, and to prepare and file a report annually.

7. Guideline B-9 Earthquake Exposure Sound Practices

In October 2014, OSFI published the new [Earthquake Exposure Data Form and Instructions](#) to be filed by May 31, 2015. The form should now be filed using the Regulatory Reporting System.

Requirements of the Autorité des marchés financiers

1. AMF Annual Guidelines for Actuarial Reports on P&C Business

The Autorité des marchés financiers (AMF) issues specific guidelines to AAs of Québec-regulated insurers for both the valuation of insurance contract liabilities and DCAT. The AA would consult these memorandums for the complete instructions from the AMF.

The AMF guideline regarding the mandatory insurance contract liabilities report is updated annually and covers regulatory requirements and the report's expected content and prescribed layout. The AMF guideline also mandates prescribed exhibits for reporting results of the AA's valuation of insurance contract liabilities. Prescribed exhibits include the unpaid claims and loss

ratio exhibits for which specific instructions are available along with the guideline at <http://www.lautorite.qc.ca/en/policy-liabilities-report-pro.html>.

The AMF also publishes a guideline for the preparation of the report on the insurer's financial condition (DCAT report). This guideline is updated annually, usually in November, and covers the same general aspects as the guideline on the valuation of insurance contract liabilities. When completing the DCAT report, AAs are advised to be aware of the latest developments in the calculation of the MCT ratio. The AMF requires the AA to annually disclose the insurer's internal capital target ratio and the DCAT guideline states that the actuary would take care to detail the methodology and assumptions used in the determination of the internal capital target ratio. The guideline is available at <http://www.lautorite.qc.ca/en/report-financial-condition-pro.html>.

2. Capital Requirements

In November 2014, the AMF published its revised MCT Guideline that came into effect on January 1, 2015. The changes are harmonized to a significant extent with the changes to OSFI's MCT guideline.

AAs would be aware that following the publication in 2013 of the revised version of the AMF's [Guideline on Sound Management and Measurement of Earthquake Exposure Earthquake Exposure Risk Management Guideline](#), the new capital rules regarding the earthquake exposure are now fully integrated within the revised MCT guideline.

AAs would be expected to be familiar with any subsequent revision to the capital requirements and incorporate them where applicable.

3. Stress Testing

From time to time, the AMF may ask institutions to carry out standardized scenario tests to assess system-wide vulnerabilities. No such specific standardized test was requested during 2015.

The actuary is reminded that the company's performance in previous stress tests can be a useful consideration for the actuary when designing/selecting current-year company-specific scenarios.

4. Integrated Risk Management Guideline and Capital Management Guideline

In May 2015, the AMF published a revised version of its [Integrated Risk Management Guideline](#) to go along with the publication of its new [Capital Management Guideline](#). The revision and the addition of the new guideline are meant to update certain concepts and to give specific expectations regarding capital and risk management, particularly for elements such as the:

- Notions of risk appetite and risk tolerance levels;
- Relations between the risk management framework, the solvency position and the strategic objectives of the insurer and their disclosure to the board of directors and senior management; and

- Own Risk and Solvency Assessment mechanisms (ORSA) related to capital management (governance, choice of capital instruments, planning of capital needs) and their impact on the insurer's risk profile.

Insurers are expected to implement the revisions and the new guideline by May 1, 2016, by developing strategies, policies, and procedures based on their nature, size, complexity and risk profile.

The AMF expects the application of the ORSA mechanism to be the subject of an official report to the board of directors at least once a year, or more often if the financial institution's risk profile changes significantly. A first report is expected to be presented by the insurers in 2016 and would be made available to the AMF upon request.

Current or Emerging Issues and Other Considerations

1. Auto Reforms

General

The AA would consider the potential effect that automobile product reforms might have on the valuation of insurance contract liabilities and DCAT analyses. The comments below pertain to the most significant recent product reforms by jurisdiction.

Ontario

At year-end 2015, the AA would be expected to continue to consider the effect of Ontario auto reforms on the valuation of insurance contract liabilities and DCAT analyses.

Before using post-reform claims experience for valuation purposes, the AA would consider the maturity of such claims experience. If the post-reform experience is not considered to be fully credible for the valuation of insurance contract liabilities and DCAT analyses, it would be reasonable to carry forward *a priori* assumptions regarding the estimated effect of product reforms, subject to consideration of rate changes, loss cost trend, and other on-level adjustments as appropriate.

The Financial Services Commission of Ontario (FSCO) published revised [technical notes](#) effective February 2015 that included updated Ontario industry benchmark assumptions. Changes included benchmark loss trends and 2010 reform loss cost adjustment factors.

Effective February 1, 2014, the government enacted several reforms to the Statutory Accident Benefits Schedule (SABS). The reform targeted the following:

- A pre-existing medical condition must have been medically documented prior to the collision;
- Compensation for attendant care must reflect the actual amount of the loss incurred, not the maximum benefit payable; and
- Multiple elections among income replacement, non-earner, and caregiver benefits are not permitted for the duration of a claim.

Legislative changes to attendant care could potentially shift judicial reimbursement for family provided attendant care to bodily injury under the Future Care heading.

Bill 15 (Fighting Fraud and Reducing Automobile Insurance Rates Act, 2014) received royal assent on November 20, 2014, and includes the following cost saving initiatives:

- Lowering the 5% prejudgment interest on non-pecuniary damages to a rate closer to inflation (1.3% per annum) (implemented January 1, 2015 regardless of date of loss) (please refer to *Cirillo v. Rizzo and El-Khodr v. Lackie*)
- Legislative amendments to overhaul the dispute resolution system (implementation is not expected this year);
- Dispute resolution system will no longer be housed with FSCO but with the Ministry of the Attorney General's Licence Appeal Tribunal effective April 1, 2016;
- Reducing fraud related to repairing a vehicle after a collision (expected implementation later this year); and
- Provincial regulation of the towing industry (expected implementation later this year).

The announcement of the Ontario budget in April 2015 includes the following proposed amendments to the Insurance Act Auto Regulations. The impact of these changes will be quantified as regulations are defined.

Proposed [amendments](#) to SABS aim to reduce costs in the auto insurance system and to bring them more in line with those of other provinces, and include more choice for consumers:

- Change the standard benefit level for medical and rehabilitation benefits to \$65,000 (from \$50,000) and include attendant care services under this benefit limit. Consumers will also have an option to increase that coverage up to \$1 million.
- Reduce the standard duration of medical and rehabilitation benefits from 10 years to five years for all claimants except children.
- Include attendant care services with the \$1 million medical and rehabilitation benefit for catastrophic impairments, and provide the option for additional coverage of \$1 million, for \$2 million in total coverage.
- Eliminate the six month waiting period for non-earner benefits and limit the duration of non-earner benefits to two years after the accident.
- Require goods and services not explicitly listed in SABS to be essential and agreed upon by the insurer.
- Updating the catastrophic impairment definition consistent with more up-to-date medical information and knowledge. Amendments will be proposed based on the superintendent's report on the definition of catastrophic impairment in the SABS, subject to modifications.

Proposed [amendments](#) to insurance act regulation 664 to help reduce auto insurance costs include the following:

- Lowering the maximum interest rate charged on monthly auto insurance premium payments to 1.3 percent from 3 percent;

- Change the standard deductible for comprehensive coverage to \$500 from \$300;
- Require that all insurers offer a discount for the use of winter tires; and
- Prohibit premium increases for minor at-fault accidents that meet certain criteria.

Proposed [amendments](#) to insurance act regulation 461/96 to reflect the effects of inflation include the following:

- Adjust the deductibles on court awards for non-pecuniary damages to reflect inflation since 2003, and link the deductibles to future changes in inflation;
- Adjust the monetary thresholds beyond which the tort deductible does not apply to reflect inflation since 2003, and link the thresholds to future changes in inflation; and
- Allow for the effect of the tort deductible to be taken into account when determining a party's entitlement to costs in an action for damages from bodily injury or death arising directly or indirectly from the use or operation of an automobile.

Although not in the budget documents, officials have reported that they expect the new minor injury guidelines to be released this year as well.

Nova Scotia

Effective April 1, 2012, the Government of Nova Scotia increased no-fault mandatory medical-rehabilitation limits to \$50,000 from the previous limit of \$25,000.

Effective April 1, 2013, the direct compensation (DC) for property damage framework was introduced as well as the new minor injury treatment protocol (based on Alberta's current model).

The second phase was to include the optional full tort (OFT) product for minor injuries, but implementation of the OFT was delayed following a recommendation of the Nova Scotia Utility and Review Board. A decision regarding the implementation of an OFT product is still pending with the Nova Scotia minister of transportation and infrastructure renewal.

New Brunswick

Effective July 1, 2013, the cap on court awards for non-pecuniary damage for a minor injury was increased from \$2,500 to \$7,500 with annual indexation to the Consumer Price Index. The definition of *minor personal injury* was also changed to align more closely with Alberta and Nova Scotia.

Prince Edward Island

Effective October 1, 2014, the cap on non-pecuniary damage for a minor injury was increased from \$2,500 to \$7,500 to be in line with New Brunswick and Nova Scotia. As well, the definition of minor personal injury was amended to include only strains, sprains and whiplash-associated disorders that do not result in a serious impairment. Accident benefits coverage was expanded to be more in line with other Atlantic provinces with increases for medical, rehabilitation, funeral, and death benefits, and loss of income.

The government intends to implement DC for property damage effective for accidents occurring on or after October 1, 2015.

2. Recent Judicial, Legislative, and Political Events

Regular communications with claims professionals is essential to the work of the AA. These discussions would encompass the potential effect of recent court decisions, judicial events, and political events that may be relevant to the valuation of insurance contract liabilities. Recent examples of such events include the following, all of which relate to automobile claims in the Province of Ontario:

- *Cirillo v. Rizzo* (2015)

A lower court decision has been made to apply the recent amendment to the pre-judgment interest provisions to persons injured in auto collisions that occurred prior to January 1, 2015.

- *El-Khodr v. Lackie* (2015)

A lower-court decision has been made whereby the judge disagrees with Cirillo's decision and upholds the 5 percent pre-judgment interest rate resulting from a motor vehicle accident prior to January 1, 2015. This case is now under appeal.

- *Futrell v. State Farm* (2015)

This case concerns extending the definition of *economic loss* when referring to an incurred expense related to an attendant care claim. Effective February 1, 2014, the government enacted several reforms – among them, that compensation for attendant care must reflect the actual amount of the loss incurred, not the maximum benefit payable.

The change to this definition is to apply to claims occurring after February 1, 2014. Therefore, these expenses meet the definition of economic loss as it relates to attendant care and the claimant would be entitled to the Form 1 monthly amount if they can prove the expenses were incurred for attendant care benefit.

- *Guo v. State Farm* (2014)

This case elaborates on what will be considered an *economic loss* under the SABS. In light of this decision, insurers should be aware of the following:

- Increased expenditures may be considered an economic loss if they are consistently spent over the period of time the person needed attendant care;
- Moving into someone else's home and thus increasing their expenditures may be considered an economic loss; and
- Special awards may not be given in cases where the dispute involves credibility and is a justiciable issue.

- *Julia Lo-Papa v. Certas* (2014)

The applicant did not present sufficient evidence to meet the onus that psychiatric symptoms were sufficient to remove her from the minor injury guideline.

- *Augustin v. Unifund* (2014)

The arbitrator emphasizes the importance of insurers providing proper notice with reasons for refusing to pay for the medical treatment claimed by the insured person. The notice must include a medical reason and any other reasons for the denial. Equally, an insurer who requires an independent medical evaluation to take place, must give the insured person a notice that includes the medical reason and other reasons for requiring the examination. This decision suggests that an insured person is entitled to specific information, including medical reasons, about why they are being required to attend an independent medical evaluation requested by the insurer upon application for a medical benefit.

A recent example that relates to automobile claims in the Province of Alberta is as follows:

- *Hammond v. DeWolfe* (2014)

The Alberta Court of Appeal concluded the Insurance Act restrictions on the recovery of income-related damages where a claimant has an alternate source of recovery have no application when that alternate source of recovery is an employer's income benefits program rather than an insurance policy. Therefore, payments that claimants receive under income benefit plans offered by employers rather than by insurers are not to be deducted from lost earning damages awards, and the employers who make payments under such plans can continue to recover from the at-fault party's automobile insurer what they have paid based on subrogation.

The outcome of a class action may also affect the ultimate amount that will be required to settle a group of opened claims. An example which relates to a class action currently underway is as follows:

- *Pyrite Loss* (2014)

Michel Richard, J.C.S. issued a judgment ("landmark judgment") in matters pertaining to the problem of pyrite. This Québec Superior Court ruling relates to third-party liability insurance on continuous and progressive damage and pro rata apportionment among successive insurers. Several home owners and business owners were claiming compensation totalling \$200 million for the replacement of the foundations of their buildings. The parties involved have appealed the decision.

In 2014, the BC Law and Equity Act was revised, reducing the discount rates used in determining lump sum for personal injury cases to 1.5% for future income loss and to 2.0% for cost of future care. These rates had not been changed since being established in 1981, over 32 years ago and were 2.5% and 3.5%, respectively.

Historical, additional court cases that are still relevant are listed in prior annual Guidance to the Appointed Actuary.

3. Catastrophic Events

From time to time, catastrophic events occur that have the potential to affect an AA's estimate of claims liabilities and, in some cases, the premium liabilities. Events that are considered

catastrophic on an industry-wide basis may not have a catastrophic effect on a given insurer, while smaller industry events may. The extent to which such events are significant in the context of a valuation of a specific insurer's insurance contract liabilities depends on the nature of the insurer's business, its exposure in the affected region, policy wordings, and, of course, the date on which the event occurred.

Guidance to Members on Specific Situations

From time to time, CIA members seek advice or guidance from the PCFRC. The committee strongly encourages such dialogue. CIA members are assured that it is proper and appropriate for them to consult with the chair or vice-chair of the PCFRC.

CIA members are reminded that responses provided by the PCFRC are intended to assist them in interpreting CIA standards of practice, educational notes, and rules of professional conduct, and in assessing the appropriateness of certain techniques or assumptions. A response from the PCFRC does not constitute a formal opinion as to whether the work in question is in compliance with the CIA standards and rules. Guidance provided by the PCFRC is not binding upon the member.

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Appendix A

Here is a list of the CIA documents referenced in this educational note:

Standards of Practice

- [Standards of Practice](#)
- [Rules of Professional Conduct](#)

Task Force Reports

- [Materiality](#) (October 2007)
- [Appropriate Treatment of Reinsurance](#) (October 2007)

Educational Notes

- [Premium Liabilities](#) (March 2015)
- [Dynamic Capital Adequacy Testing](#) (November 2013)
- [Subsequent Events](#) (October 2015)
- [Evaluation of the Runoff of P&C Claims Liabilities when the Liabilities are Discounted in Accordance with Accepted Actuarial Practices](#) (June 2011)
- [Discounting](#) (November 2010)
- [Accounting for Reinsurance Contracts under International Financial Reporting Standards](#) (December 2009)
- [Margins for Adverse Deviations for Property and Casualty Insurance](#) (December 2009)
- [Classification of Contracts under International Financial Reporting Standards](#) (June 2009)
- [Consideration of Future Income Taxes in the Valuation of Policy Liabilities](#) (July 2005)
- [Valuation of Policy Liabilities P&C Insurance Considerations Regarding Claim Liabilities and Premium Liabilities](#) (June 2003)

Research Paper

- [Disclosure Requirements IFRS 4 – Insurance Contracts for P&C Insurers](#) (October 2010)

Appendix B

Calculation of the Duration of Liabilities

In the calculation of the interest rate risk margin, an interest rate shock factor is applied to the fair value of interest rate sensitive assets and liabilities and their duration. AAs are expected to be involved in the calculation of the duration of liabilities and possibly of assets.

Introduction

Instructions on the calculation of the interest rate risk margin are provided in chapter 5 of OSFI's Minimum Capital Test Guideline (or the AMF's equivalent guideline). The key points for the calculation of the duration are:

- AAs may use either the modified duration or the effective duration to calculate the duration of assets and liabilities. However, the same duration methodology would apply to all assets and liabilities under consideration. Moreover, the same methodology is to be used consistently from year to year.
- Effective duration is the preferred measure when interest rate changes may change the expected cash flows.
- The portfolio duration can be obtained by calculating the weighted average of the duration for the assets or liabilities in the portfolio.
- The formulas for calculating the durations are:

$$\text{Macaulay Duration} = \frac{\sum_{t=0}^n t \times \text{PVCF}_t}{k \times \text{Market Value}}$$

Note: the Macaulay duration is an intermediate step in the calculation of the modified duration and is *not* a measure of duration accepted by the regulator.

$$\text{Modified Duration} = \frac{\text{Macaulay Duration}}{1 + \frac{\text{yield}}{k}}$$

Where:

- k = number of periods, or payments, per year (e.g., $k = 2$ for semi-annual payments and $k = 12$ for monthly payments)
- n = number of periods until maturity (i.e., number of years to maturity times k)
- yield = market value yield to maturity of the cash flows
- PVCF_t = present value of the cash flow in period t discounted at the yield to maturity

$$\text{Effective Duration} = \frac{\text{Fair value if yields decline} - \text{fair value if yields rise}}{2 \times \text{initial price} \times \text{change in yield in decimal}}$$

or

$$\text{Effective Duration} = \frac{V_- - V_+}{2 \times V_0 \times \Delta y}$$

Where:

- Δy = change in yield in decimal
- V_0 = initial fair value
- V_- = fair value if yields decline by Δy
- V_+ = fair value if yields increase by Δy

Assets

AAs may be asked to calculate the duration of the interest-rate-sensitive assets in the insurer's portfolio. Usually, the main classes of assets for most insurers are bonds and preferred shares. An example of the calculation for bonds is presented in this appendix.

In some cases, the insurer's investment specialists would provide the duration of assets. The AA would review the information for reasonableness and identify which duration formula was used to ensure consistency between assets and liabilities.

Claim and Premium Liabilities

When evaluating the duration of the claim and premium liabilities, AAs would consider the following:

- The duration calculation would be consistent with the discounting calculation.
- The duration may be calculated by line of business using the payout patterns used for discounting. The line of business durations would then be weighted to derive the total claim liabilities duration.
- Alternatively, the future payouts may be evaluated for all lines of business and the duration of the combined payout calculated on this aggregated payout.
- When the change in interest rate is small, the modified duration and effective duration are the same or approximately the same. Therefore, the effective duration can be used to assess the reasonableness of the calculation of the modified duration, or even as a proxy for modified duration if appropriate.
- For premium liabilities, the following additional considerations apply:
 - The cash flow would be discounted to the future accident date; and
 - The average accident date and estimated cash flows vary with policy term.

- The duration calculations would be net of reinsurance and net of salvage and subrogation.

The following examples are provided to help AAs in calculating durations for the purpose of the interest rate risk margin. They are intended to be illustrative, rather than prescriptive, and in accordance with OSFI and AMF guidelines.

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Asset Duration

Year-end Information

Description	Bond #1	Bond #2	Bond #3
Valuation Date	2015/12/31	2015/12/31	2015/12/31
Maturity Date	2016/12/31	2017/06/30	2018/06/30
Coupon Rate	2.50%	6.60%	4.65%
Coupon # (k)	2	2	2
Par value	1,250	1,875	1,125
Market value	1,265	2,010	1,140
Coupon \$	16	62	26
$i_{(2)}$	0.64%	0.86%	2.04%
Annual Yield = $i_{(2)} * 2$	1.29%	1.72%	4.08%

Step 1: Future payment for assets

Year	Cash flows		
	Bond #1	Bond #2	Bond #3
2016.5	16	62	26
2017.0	1,266	62	26
2017.5	-	1,937	26
2018.0	-	-	26
2018.5	-	-	1,151

Step 2: Calculation of duration for assets

Change in yield = 0.10%

Year	Lag	Cash Flows	PV factor	Discounted Cash Flows	Lag * Discounted Cash Flows	Δy Decrease in yield	Δy Increase in yield	Discounted Cash fl. w/ Δy Decrease in yield	Discounted Cash fl. w/ Δy Increase in yield
(1)	(2)	(3)	(4)	(5)	(6)	(8)	(10)	(11)	(12)
Bond #1									
2016.5	0.5	16	0.9936	16	8	0.9931	0.9931	16	16
2017.0	1.0	1,266	0.9873	1,250	1,250	0.9883	0.9863	1,251	1,248
2017.5	1.5	-	0.9810	-	-	0.9824	0.9795	-	-
2018.0	2.0	-	0.9747	-	-	0.9757	0.9728	-	-
2018.5	2.5	-	0.9685	-	-	0.9709	0.9661	-	-
Total				1,265	1,257			1,266	1,264
				(7) Macaulay duration	0.994			(13) Effective duration	0.981
				(8) Modified duration	0.981				

Change in yield = 0.10%

Year	Lag	Cash Flows	PV factor	Discounted Cash Flows	Lag * Discounted Cash Flows	Δy Decrease in yield	Δy Increase in yield	Discounted Cash fl. w/ Δy Decrease in yield	Discounted Cash fl. w/ Δy Increase in yield
(1)	(2)	(3)	(4)	(5)	(6)	(8)	(10)	(11)	(12)
Bond #2									
2016.5	0.5	62	0.9915	61	31	0.9920	0.9910	61	61
2017.0	1.0	62	0.9831	61	61	0.9841	0.9822	61	61
2017.5	1.5	1,937	0.9748	1,888	2,832	0.9762	0.9733	1,891	1,885
2018.0	2.0	-	0.9665	-	-	0.9684	0.9646	-	-
2018.5	2.5	-	0.9583	-	-	0.9607	0.9560	-	-
Total				2,010	2,924			2,013	2,007
				(7) Macaulay duration	1.454			(13) Effective duration	1.430
				(8) Modified duration	1.430				

Change in yield = 0.10%

Year	Lag	Cash Flows	PV factor	Discounted Cash Flows	Lag * Discounted Cash Flows	Δy Decrease in yield	Δy Increase in yield	Discounted Cash fl. w/ Δy Decrease in yield	Discounted Cash fl. w/ Δy Increase in yield
(1)	(2)	(3)	(4)	(5)	(6)	(8)	(10)	(11)	(12)
Bond #3									
2016.5	0.5	26	0.9802	26	13	0.9807	0.9797	26	26
2017.0	1.0	26	0.9608	25	25	0.9617	0.9598	25	25
2017.5	1.5	26	0.9417	25	37	0.9431	0.9404	25	25
2018.0	2.0	26	0.9231	24	48	0.9248	0.9213	24	24
2018.5	2.5	1,151	0.9048	1,042	2,604	0.9070	0.9026	1,044	1,039
Total				1,141	2,727			1,144	1,138
				(7) Macaulay duration	2.390			(13) Effective duration	2.296
				(8) Modified duration	2.296				

- (4) PV factor = $1 / (1 + \text{yield})^{\text{lag}}$
- (5) Discounted payment = (3) * (4)
- (6) Lag * Discounted cash flows = (2) * (5)
- (7) Macaulay duration = Sum of (6) / Sum of (5)
- (8) Modified duration = (7) / (1 + yield)

- (9) Δy Decrease in yield = $1 / (1 + \text{yield} - \text{change in yield})^{\text{lag}}$
- (10) Δy Increase in yield = $1 / (1 + \text{yield} + \text{change in yield})^{\text{lag}}$
- (11) Discounted cash flows w/ Δy Decrease in yield = (3) * (9)
- (12) Discounted cash flows w/ Δy Increase in yield = (3) * (10)
- (13) Effective duration = (sum(11) - sum(12)) / (2 * change in yield * sum(5))

Step 3: Weighted Duration of Assets

	Market Value	Modified Duration	Effective Duration
Asset #1	1,265	0.981	0.981
Asset #2	2,010	1.430	1.430
Asset #3	1,140	2.296	2.296
Total	4,415	1.525	1.525

Claims Liabilities and Premium Liabilities Duration

Year-end Information

Unpaid as at December 31, 2015

Accident Year	Unpaid as at December 31, 2015		Payment Pattern		
	Property	Liability	Age	Property	Liability
2011	-	32	12	80%	35%
2012	-	86	24	95%	68%
2013	-	127	36	100%	80%
2014	16	186	48	100%	85%
2015	137	258	60	100%	90%
			72	100%	95%
			84	100%	99%
			96	100%	100%

Yield = 1.75%

Unearned Premium Reserve (UPR) for Property = 550

Expected Loss Ratio for Property (ELR) = 65%

UPR for Liability = 380

ELR for Liability = 80%

Maintenance Expense % = 3.5%

Step 1: Future payment for claims liabilities

Property

Accident Year	Unpaid	Paid in						
		2016	2017	2018	2019	2020	2021	2022
2011	-							
2012	-							
2013	-							
2014	16	16	-	-	-	-	-	-
2015	137	103	34	-	-	-	-	-
Total	153	119	34	-	-	-	-	-

payout for AY 2015 @ 2016 = 137 / (1-80%) * (95% - 80%)

payout for AY 2015 @ 2017 = 137 / (1-80%) * (100% - 95%)

payout for AY 2014 @ 2016 = 16 / (1-95%) * (100% - 95%)

Liability

Accident Year	Unpaid	Paid in						
		2016	2017	2018	2019	2020	2021	2022
2011	32	32	12	3				
2012	86	29	29	23	6			
2013	127	32	32	32	25	6		
2014	186	131	29	29	29	23	6	
2015	258	131	48	20	20	20	16	4
Total	689	277	150	107	80	49	22	4

payout for AY 2015 @ 2016 = 258 / (1-35%) * (68% - 35%)

payout for AY 2015 @ 2017 = 258 / (1-35%) * (80% - 68%)

payout for AY 2014 @ 2016 = 186 / (1-68%) * (80% - 68%)

etc.

Claims Liabilities and Premium Liabilities Duration

Step 2: Calculation of duration for claims liabilities

Property

Yield		1.75%		Change in yield		0.10%				
Year (1)	Lag (2)	Payment (3)	PV factor (4)	Discounted Payment (5)	Lag * Discounted Payment (6)	Δy Decrease in yield (9)	Δy Increase in yield (10)	Discounted Payment w/ Δy Decrease in yield (11)	Discounted Payment w/ Δy Increase in yield (12)	
2016	0.5	119	0.9914	118	59	0.9919	0.9909	118	118	
2017	1.5	34	0.9743	33	50	0.9758	0.9729	33	33	
2018	2.5	-	0.9576	-	-	0.9599	0.9552	-	-	
2019	3.5	-	0.9411	-	-	0.9443	0.9379	-	-	
2020	4.5	-	0.9249	-	-	0.9290	0.9208	-	-	
2021	5.5	-	0.9090	-	-	0.9139	0.9041	-	-	
2022	6.5	-	0.8934	-	-	0.8991	0.8877	-	-	
Total		153		151	109			151	151	
(7) Macaulay duration					0.721	(13) Effective duration				0.708
(8) Modified duration					0.708					

Liability

Yield		1.75%		Change in yield		0.10%				
Year (1)	Lag (2)	Payment (3)	PV factor (4)	Discounted Payment (5)	Lag * Discounted Payment (6)	Δy Decrease in yield (9)	Δy Increase in yield (10)	Discounted Payment w/ Δy Decrease in yield (11)	Discounted Payment w/ Δy Increase in yield (12)	
2016	0.5	277	0.9914	275	137	0.9919	0.9909	275	275	
2017	1.5	150	0.9743	146	219	0.9758	0.9729	146	146	
2018	2.5	107	0.9576	102	256	0.9599	0.9552	103	102	
2019	3.5	80	0.9411	75	264	0.9443	0.9379	76	75	
2020	4.5	49	0.9249	46	206	0.9290	0.9208	46	46	
2021	5.5	22	0.9090	20	108	0.9139	0.9041	20	20	
2022	6.5	4	0.8934	4	23	0.8991	0.8877	4	4	
Total		689		667	1,213			669	666	
(7) Macaulay duration					1.818	(13) Effective duration				1.786
(8) Modified duration					1.786					

(4) PV factor = 1 / (1 + yield) ^ lag

(5) Discounted payment = (3) * (4)

(6) Lag * Discounted payment = (2) * (5)

(7) Macaulay duration = Sum of (6) / Sum of (5)

(8) Modified duration = (7) / (1 + yield)

(9) Δy Decrease in yield = 1 / (1 + yield - change in yield) ^ lag

(10) Δy Increase in yield = 1 / (1 + yield + change in yield) ^ lag

(11) Discounted payment w/ Δy Decrease in yield = (3) * (9)

(12) Discounted payment w/ Δy Increase in yield = (3) * (10)

(13) Effective duration = (sum(11) - sum(12)) / (2 * change in yield * sum(5))

Step 2a: Average duration for claims liabilities

	PV of Unpaid Claims	PFAD	APV of Unpaid Claims	Modified Duration	Effective Duration
Property	151	5	156	0.708	0.708
Liability	667	115	782	1.786	1.786
Total	818	120	938	1.607	1.607

Claims Liabilities and Premium Liabilities Duration

Appendix B

Liability

Sheet 5

Yield		1.75%		Change in yield		0.10%			
Year (1)	Lag (2)	Payment (3)	PV factor (4)	Discounted Payment (5)	Lag * Discounted Payment (6)	Δy Decrease in yield (9)	Δy Increase in yield (10)	Discounted Payment w/ Δy Decrease in yield (11)	Discounted Payment w/ Δy Increase in yield (12)
2016	0.2929	127	0.9949	127	37	0.9952	0.9946	127	126
2017	1.2929	87	0.9778	85	110	0.9791	0.9766	85	85
2018	2.2929	32	0.9610	31	71	0.9632	0.9588	31	31
2019	3.2929	15	0.9445	14	47	0.9475	0.9414	14	14
2020	4.2929	15	0.9282	14	61	0.9322	0.9243	14	14
2021	5.2929	15	0.9123	13	70	0.9170	0.9075	13	13
2022	6.2929	10	0.8966	9	58	0.9021	0.8910	9	9
2023	7.2929	2	0.8812	2	15	0.8875	0.8749	2	2
Total				296	469			296	295

(7) Macaulay duration **1.588** (13) Effective duration **1.561**
 (8) Modified duration **1.561**

Maintenance expenses

Yield		1.75%		Change in yield		0.10%			
Year (1)	Lag (2)	Payment (3)	PV factor (4)	Discounted Payment (5)	Lag * Discounted Payment (6)	Δy Decrease in yield (9)	Δy Increase in yield (10)	Discounted Payment w/ Δy Decrease in yield (11)	Discounted Payment w/ Δy Increase in yield (12)
2016	0.2929	33	0.9949	32	9	0.9952	0.9946	32	32
2017	1.2929	-	0.9778	-	-	0.9791	0.9766	-	-
2018	2.2929	-	0.9610	-	-	0.9632	0.9588	-	-
2019	3.2929	-	0.9445	-	-	0.9475	0.9414	-	-
2020	4.2929	-	0.9282	-	-	0.9322	0.9243	-	-
2021	5.2929	-	0.9123	-	-	0.9170	0.9075	-	-
2022	6.2929	-	0.8966	-	-	0.9021	0.8910	-	-
2023	7.2929	-	0.8812	-	-	0.8875	0.8749	-	-
Total				32	9			32	32

(7) Macaulay duration **0.293** (13) Effective duration **0.288**
 (8) Modified duration **0.288**

- (4) PV factor = $1 / (1 + \text{yield})^{\text{lag}}$
- (5) Discounted payment = (3) * (4)
- (6) Lag * Discounted payment = (2) * (5)
- (7) Macaulay duration = Sum of (6) / Sum of (5)
- (8) Modified duration = (7) / (1 + yield)
- (9) Δy Decrease in yield = $1 / (1 + \text{yield} - \text{change in yield})^{\text{lag}}$
- (10) Δy Increase in yield = $1 / (1 + \text{yield} + \text{change in yield})^{\text{lag}}$
- (11) Discounted payment w/ Δy Decrease in yield = (3) * (9)
- (12) Discounted payment w/ Δy Increase in yield = (3) * (10)
- (13) Effective duration = (sum(11) - sum(12)) / (2 * change in yield * sum(5))

Step 4a: Average duration for premium liabilities

	PV of Premium Liabilities	PFAD	APV of Premium Liabilities	Modified Duration	Effective Duration
Property	354	12	366	0.489	0.489
Liability	296	51	347	1.561	1.561
Maintenance	32	-	32	0.288	0.288
Total	682	63	745	0.979	0.979

30.66

CONSOLIDATED

MCT (BAAT) MARKET RISK CAPITAL (MARGIN) REQUIREMENTS
(\$'000)

Interest rate shock factor
0.01250 (0.01250)

Capital (Margin) Required for Interest Rate Risk				
(55)	Fair value (01)	Modified or effective duration (02)	Dollar fair value change (01)x(02)xΔy (03)	Dollar fair value change (01)x(02)x(-Δy) (04)
Interest rate sensitive assets:				
Term deposits 01			0	0
Bonds and debentures 02	4,415	1.5250	84	-84
Commercial paper 03			0	0
Loans 04			0	0
Mortgages 05			0	0
MBS and ABS 06			0	0
Preferred shares 07			0	0
Other (specify) 08			0	0
Total interest rate sensitive assets 09	4,415		84	-84
Interest rate sensitive liabilities:				
Net unpaid claims and adjustment expenses 10	1,608	1.6070	19	-19
Net premium liabilities 11	745	0.9785	9	-9
Other as approved by OSFI 12			0	0
Total interest rate sensitive liabilities 19	1,608		28	-28
Allowable interest rate derivatives:				
	Notional value (05)		Dollar fair value Δy (06)	Dollar fair value Δy (07)
Long positions 20				
Short positions 21				
Total allowable interest rate derivatives 22			0	0
Capital required for Δy shock increase 30			56	
Capital required for Δy shock decrease 31				0
Total interest rate risk margin 39				56

Note: Δy = 1.25%