C-9: Property Risk Pricing: Changing the World, one Valuation at a Time

CARe Seminar, June 6-7, 2016

Boston, Massachusetts

John Buchanan, Principal – Excess and Reinsurance, Verisk / ISO
Chris Boggs, Vice President of Education, Insurance Journal Academy of Insurance

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CARe C-9 Property Risk Pricing
Description

This session will describe the main takeaways from the recently jointly released IFoA/CAS GIRO white paper. This paper is being used as a reference document by primary companies, brokers, and reinsurers to highlight the need for capturing the most important data elements used by reinsurers and a deeper understanding of how each of the elements fit together. A case study approach will be taken to highlight the main takeaways, including the critical importance of properly assessing the valuations of the properties and various related rating variables.

We will also discuss the extension of these concepts to other lines of business.

Moderator / Presenter:
John W. Buchanan, Principal, Excess & Reinsurance, Verisk / ISO
Presenter:
Chris Boggs, Vice President of Education, Insurance Journal Academy of Insurance

CARe C-9 Property Risk Pricing
Agenda

- **Introduction / GIRO White Paper Overview**
  - John Buchanan 5 minutes
- **Property Valuation Concepts**
  - Chris Boggs 35 minutes
- **Other GIRO Reference Sections / 2016-17 Plans**
  - John Buchanan 30 minutes
- **Q&A** 10 minutes

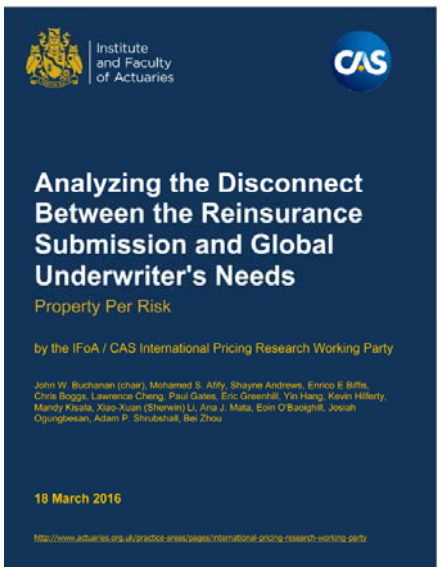
To the extent there is time, will pause for questions after each of the Three main sections. Otherwise, will have questions at the end.

Section I

Introduction

John Buchanan

GIRO Paper Release – Actuarial Review



actuarialEXPERTISE

Joint IFoA/CAS International Pricing Paper Now Available

The CAS and the Institute and Faculty of Actuaries (IFoA) have issued a joint research paper for analyzing international property per risk exposures that is now available for download.

Titled "Analyzing the Disconnect between the Reinsurance Submission and Global Underwriter's Needs," the research aims to fill the void in current actuarial literature related to requirements for primary and reinsurance pricing practitioners.

Topics addressed in the paper include:

- Analyzing various "amounts of insurance" definitions typically used worldwide.
- Analyzing the impact of each of the traditional property risk characteristics (standard COPE — construction, occupancy, protection, and exposure).
- Producing robust price monitoring systems.
- Using information typically included in cat model submissions.

The paper's intent is to illustrate the importance of each of these data elements and to be a reference document for all parties to the insuring transaction.

In 2015 the U.K. Institute and Faculty of Actuaries General Insurance Research Organization (IFoA-GIRO) and the Casualty Actuarial Society's Casualty Actuaries in Reinsurance (CAS-CARe) jointly formed a GIRO working party to produce this reference source for use by underwriters, actuaries and other pricing practitioners internationally.

The results of this GIRO Working Party reference document will be presented at the Boston CAS/CARe Seminar on Reinsurance, June 6-7, 2016, by two of the authors: John Buchanan, FCAS, MAAA, and Chris Boggs.

IFoA / CAS International Pricing Research Working Party - 2015
Analyzing the Disconnect Between the Reinsurance Submission and Global Underwriter's Needs - Property Per Risk

Contents

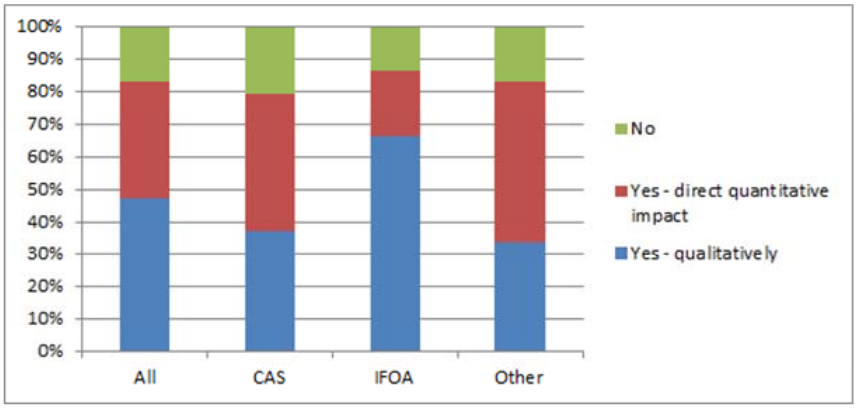
Chapter 6: Amount of Insurance Definition

- **What does it really represent**
  - The term "policy limit" is meant to refer to the maximum loss an insurer is usually obligated to pay in the event of a loss.
  - The amount of information contained in that one single value is extremely limited.
  - Without clear and precise definition, exposure information can be confusing or misleading
- **MPL, PML, MFL, average location, top/largest location, key location…**
- **Business interruption**
- **Shares of excess policies, ventilated layering, valued policies**

Chapter 6: AOI Definition – Survey Importance

Initial survey results indicated that a well-defined, in-force risk profile is the most important item for exposure-based pricing. Per the survey results of all the Actuarial organizations, a quantitative representation of the property exposures is received more than 90 percent of the time. However, a written explanation of the risk profile containing information such as: how is sum insured defined, what is meant by a risk, usage of facultative etc. is only usually received 25 percent of the time. From eight commonly used items in exposure rating, this written explanation was ranked the fourth most important. Additionally, as the below question shows, a vast majority of the time (82 percent) the inclusion of a written explanation of the risk profile has either a qualitative or quantitative impact on price.

Figure 6 - Does a written explanation of the risk profile construction affect your pricing?



Chapter 6: Exposure Definition Reference

6.5 Detailed Exposure Information – Knowing the Business That You Write

Each exposure measure discussed above is useful for various purposes. Regardless of that purpose, clearly communicating the definition of the terms used is essential. For the primary insurance professional to have a clear understanding of the risk it carries on its books, detailed information must be available regarding both the coverage offered in the insurance policy and the property to which that coverage applies.

For property reinsurance to be properly and accurately priced, the reinsurance analyst also needs a clear picture and a thorough understanding of the reinsured exposure. Both the primary insurer and the reinsurer must be able to answer to following questions about the exposures for which they provide coverage:

- Policy Limits and Coverages:
  - Does reinsured business include single location policies, multiple location policies, or both?
  - Are limits provided based on Key Location Value, the sum of all location values, or, possibly, an average location value?
    - Is location level data provided for multi-location policies?
  - If multiple locations are proximately close to each other, and can potentially be affected by a single occurrence (catastrophe, explosion, conflagration), does the policy limit represent an aggregate total limit, or is the full limit available to each location?
  - Does coverage include building, contents, BI, or only a subset of these?
  - Are coverage limits listed separately or as a single limit? If a single limit is shown, is it the largest coverage limit, or the sum of coverage limits?
  - How is BI limit calculated? Is it an estimate or a firm limit set by policy language?
- Perils and Exposures Covered
  - Does the policy exclude loss caused by wind (hurricane), earthquake, terrorism, or other perils?
  - Are there sub-limits for certain perils?
- Deductibles and Self-Insured Retentions
  - Where does coverage begin? Policy language generally states that the deductible is subtracted from the total loss, so the possibility exists that the entire policy limit could be paid.
- Shared and Layered
  - Are there primary and excess policies covering a single account or location?
  - Do policies cover 100 percent of each layer or are there partial participations?
  - If there are partial participations, do they differ by layer and what are the differences?
  - If coverage is layered, are all layers written or is there ventilation?
  - Can it be deduced from the information provided which layered policies are "stacked" and apply to the same location or account?
- Total Value of the Risk
  - Regardless of limit, deductible, and participation of insurance policy, what is the total value of the risk underlying each coverage?
- Occupancy

  - Is information provided on either the occupancies present at each location, possibly the predominant occupancy, or the occupancy perceived as constituting the greatest source of risk?
  - Is it possible to distinguish the difference in the mix of occupancy classes between smaller exposures and larger exposures?

6.6 The Impact of PML on Reinsurance Pricing

Rarely is the total value of the insured property damaged by a covered peril, so the concept of PML (Possible Maximum Loss) is generally used by insurers in countries such as Japan.

When submissions are sent to reinsurers, ideally the risk profiles would not only include the information on insured values but also on PMLs, as shown in the figure below.

Figure 7 - Relationship of Sum Insured and PMLs

Band of Sum Insured	Number of Risks	PML ratio	Total Premiums	…
$100M to $250M	33	15.0%	$5.60M	…
$250M to $500M	18	20.0%	$1.90M	…

When the exposure rating method is utilized to price the reinsurance treaty, the information on PML ratios should be taken into account. Otherwise, the price of the reinsurance treaty may be underestimated if the reinsurance layer sits below the sum insured values but above the PML values, as sum insured values are usually much higher than PML values. The opposite may occur as well, depending upon the position of the reinsured layer to both the sum insured and PML ratios. This is due to the fact that any layering exercise simply apportions a fixed set of total losses amongst various layers.

First, the sum insured value should be multiplied by the PML ratio to obtain the PML value. Then the PML values, instead of the sum insured values, should be used in the exposure rating formula.

For example, the sum insured value of a property is JPY 50 billion and the premium is JPY 50 million. In addition, the expected loss ratio of the insured property is 50 percent. The structure of the excess-of-loss reinsurance treaty is JPY 10 billion excess of JPY 5 billion, and the assumed formula for the exposure curve is $g(x) = \sqrt{x}$.

If the sum insured value is used directly in exposure rating, the reinsurance pure premium is

$$\text{Reinsurance Pure Premium} = \text{JPY 50 million} \times 50 \text{ percent} \times \left[g\left(\frac{10 \text{ billion} + 5 \text{ billion}}{50 \text{ billion}}\right) - g\left(\frac{5 \text{ billion}}{50 \text{ billion}}\right)\right] = \text{JPY 5.787 million}$$

However, also known is that the PML ratio of the insured property is 60 percent, which means that the PML value of the insured property is only JPY 30 billion (JPY 50 billion×60 percent). Therefore, the correct amount of the reinsurance pure premium should be

$$\text{Reinsurance Pure Premium} = \text{JPY 50 million} \times 50 \text{ percent} \times \left[g\left(\frac{10 \text{ billion} + 5 \text{ billion}}{30 \text{ billion}}\right) - g\left(\frac{5 \text{ billion}}{30 \text{ billion}}\right)\right] = \text{JPY 7.471 million}$$

As is illustrated in this example, using insured value directly in exposure rating leads to a biased result which is usually lower than the correct number. Further, in this example "assuming 100% PMLs" and "applying the (PML) exposure curve" produces 5.787m pure premium. But adding the information

Section 2

Property Valuation Concepts

Chris Boggs

Values Assignable to Property

- The amount for which it could be sold
- What an expert thinks it's worth
- The value to the individual who owns the property
- The cost to replace the property with one just like it
- Depreciated value
- The cost to replace the property with something functionally equivalent
- The value assigned for tax purposes

Key Valuation Concepts

- **Indemnification:**

- **Broad Evidence Rule:**

Insurance "Values" Defined

- **Market Value –** "Insurance-related" in only a few circumstances

- **Actual Cash Value (ACV) –** Traditional valuation method

- **Replacement Cost Value (RCV)** – Not always what we explain it to be

Replacement Cost Value

- Definition: (Another term could be “Insurance to Cost”)
- Does replacement cost violate the Principle of Indemnification?

Barriers to Replacement Cost

- Actual repair or replacement
- Ineligible property
- **Coinsurance**
- **Governmental problems**

Coinsurance Concepts

- Purpose of Coinsurance:

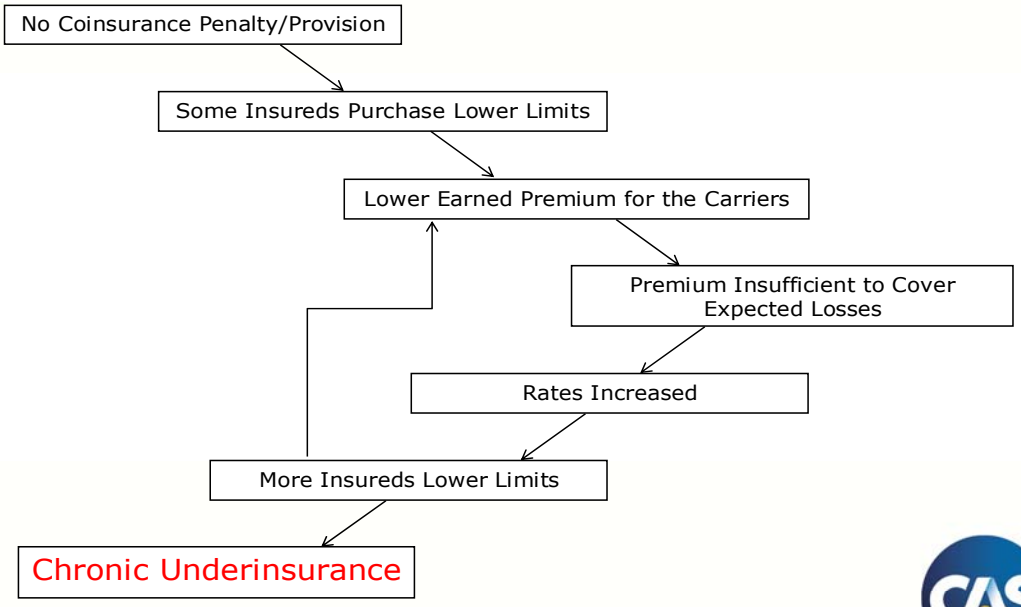
- Property “Maximums”

Why Does Coinsurance Exist

- To assure that the insurance carrier receives adequate premium for the risk insured.

- To avoid chronic underinsurance and shuttered businesses

Results of No Coinsurance



Property "Maximums"

- Maximum Possible Loss (MPL)
- Probable Maximum Loss (PML)
  - Construction (C): Classification; Size; Age
  - Occupancy (O): What the insured does; Hazards of the Occupancy
  - Protection (P): Private and Public

"Maximum" Comparison

Building 1 – 1234 Main Street

Construction (C):

- Masonry Non-Combustible (CC 4)
- 30,000 square feet
- 2 stories

Occupancy (O): Office

Protection (P):

- PPC 3
- Fully Sprinklered
- Fire stops with self-closing fire doors
- Central alarm

Building 2 – 6789 Broad Street

Construction (C):

- Joisted Masonry (CC 2)
- 8,000 square feet
- 1 story

Occupancy (O):

- Paint and body shop
- 100 gallons of paint stored in approved cabinet (H of O)

Protection (P):

- PPC 9
- Non-Sprinklered
- Fully open
- Local alarm

Governmental Problems – Ordinance or Law

- Ordinance or Law's effect on replacement cost:

- Rules applicable to "Major Damage"
  - Jurisdictional Authority Rule:
  - Percentage Rule:

Property Value Options

- Functional Replacement Cost (FRC):
- Agreed Value:
- Stated Amount:
- Inflation Guard:

Blanket Value

Blanket Limits cover:

- One type of property at multiple locations
- Two or more types of property at one or more locations

Rules:

- Coinsurance minimum increased to 90%
- Cannot combine Direct Loss with Indirect Loss
- Statement of Values must be provided

Blanket Value, Margin Clause & Coinsurance

Margin Clause:

- Limits the maximum amount payable for any one building
- Requires a Statement of Values (from which the maximum payout is calculated)
- Has four options (ISO Rules): 105%, 110%, 120%, and 130%

Margin Clause Coinsurance Example

Blanket Values at the time of the Loss (4 buildings):	$5,000,000
Coinsurance Requirement:	90%
Insurance Carried:	$3,825,000
Margin Clause Percentage (CP 12 32):	120%
Deductible:	$5,000

Building 1 suffers a total loss

The building is scheduled on the Statement of Values (CP 16 15) at $1,000,000

Value at the time of the loss: $1,300,000

How much is the insured due from the carrier?

Answer to Margin Clause/Coinsurance

Maximum available: **$1,200,000** (Calculated by multiplying the scheduled value ($1,000,000) by 1.20 from the Margin Clause)

Coinsurance Calculation based on the blanket limits:

((Did / (TIV x Coinsurance)) x Loss) – Deductible = Payment

(($3,825,000 / ($5,000,000 x .90) x $1,300,000) - $5,000 = Payment

(0.85 x $1,300,000) - $5,000 = Payment

$1,105,000 - $5,000 = $1,100,000

Insured gets the **LESSER** of:

- Maximum available limit (scheduled value x Margin Clause Percentage): $1,200,000; or
- Coinsurance calculation result: $1,100,000

Section 3

GIRO Reference Document
Other Sections

John Buchanan

Overview of Results - Primary Companies

- **Careful collection of relevant property per risk underwriting information**
  - will benefit both the primary actuaries and underwriters in their initial pricing
  - allow better connection between what the primary companies collect and what the reinsurers need in the reinsuring transaction
- **Relevance / benefits to primary markets including agents and brokers**
  - A direct correlation exists between the underwriting information gathered and the ultimate premium paid by the buyer
  - Lacking needed information, reinsurance underwriters must make underwriting assumptions.
  - Underwriting assumptions directly affect reinsurance pricing – usually resulting in higher premiums and translating into increased primary insurance pricing for commercial property insureds.
- **Understanding what information the reinsurer needs benefits all parties involved in the property insurance transaction**
  - from the main street buyer to the agent to the primary insurance carrier.

Overview of Results – Reinsurance Companies

- **Relevance / benefits to excess and reinsurance markets including reinsurance brokers**
- **'Best Price'**
  - No loadings. Most appropriate price for given risk.
- **Offensive vs Defensive strategy to acquiring business**
  - Maximize opportunity vs trying to avoid mistakes
- **'Fair Price' and 'Smooth Price'**
  - Demonstrable that price is directly based on data.
  - Less price movement post loss
- **Above leads to longer term relationships between all parties (Ceding company through broker through reinsurer)**

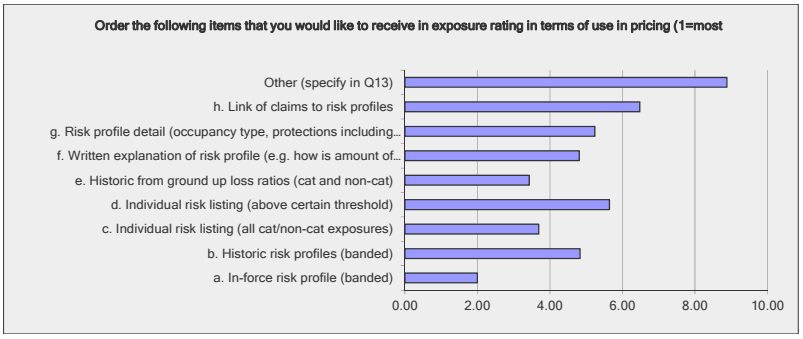
Sample White Paper Sections

- Practitioners Reference Document
- Chapter 5: Exposure and Experience Data Elements
- Chapter 6: Amount of Insurance Definition
- Chapter 7: AOI Submission Types
- Chapter 9: Historical AOI Profiles
- Chapter 10: Traditional COPE and Portfolio Extensions
- Chapter 11: Large Claim Information and link to AOI
- Chapter 12: Rate Monitoring Information

Chapter 5: Submission Quality - Exposure

Which of the following common items do you usually receive in exposure rating:

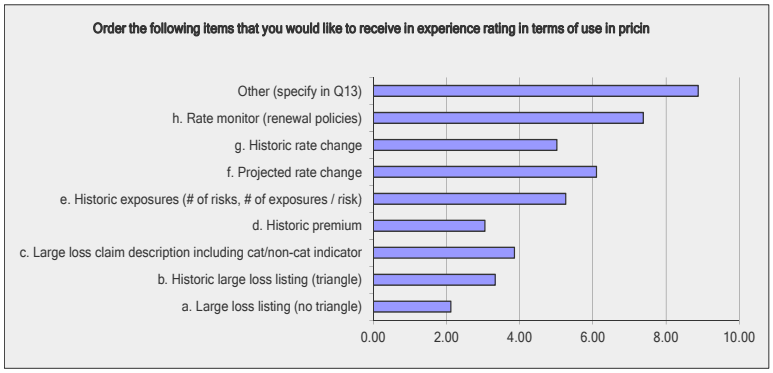
Answer Options	Yes	Desired Rank	No	Hardly Ever
a. In-force risk profile (banded)	41	1	0	3
b. Historic risk profiles (banded)	10	5	9	25
c. Individual risk listing (all cat/non-cat exposures)	13	3	8	22
d. Individual risk listing (above certain threshold)	21	7	7	14
e. Historic from ground up loss ratios (cat and non-cat)	25	2	5	14
f. Written explanation of risk profile (e.g. how is amount of insured defined,	11	4	11	22
g. Risk profile detail (occupancy type, protections including sprinkler,	15	6	11	18
h. Link of claims to risk profiles	3	8	22	19



- **What about on request?**
- **How often do you request extra items?**
- **Other items:**
  - **Historic prices**
  - **Inuring RI**
  - **Lead reinsurers**

Chapter 6: Submission Quality - Experience

Which of the following common items do you usually receive in experience rating:				
Answer Options	**Yes**	**Desired Rank**	**No**	**Hardley Ever**
a. Large loss listing (no triangle)	44	1	0	0
b. Historic large loss listing (triangle)	13	3	8	23
c. Large loss claim description including cat/non-cat	36	4	1	7
d. Historic premium	41	2	0	3
e. Historic exposures (# of risks, # of exposures / risk)	13	6	9	22
f. Projected rate change	19	7	8	17
g. Historic rate change	26	5	3	15
h. Rate monitor (renewal policies)	8	8	11	25



- What about on request?
- How often do you request extra items?
- Other items:
  - Historic prices
  - Inuring RI
  - Lead reinsurers

Chapter 6: Amount of Insurance

- **What does it really represent**
  - The term “policy limit” is meant to refer to the maximum loss an insurer is usually obligated to pay in the event of a loss.
  - The amount of information contained in that one single value is extremely limited.
  - Without clear and precise definition, exposure information can be confusing or misleading
- **MPL, PML, MFL, average location, top/largest location, key location…**
- **Business interruption**
- **Shares of excess policies, ventilated layering, valued policies**

Chapter 6: Multi-Location Policies
What is a Risk?

What is a risk? This is not self-evident since industrial fire policies typically cover multiple locations. There are mainly three different types of profiles:

- ***Policy profile: Each policy is understood as one risk.*** The risk profile contains the cumulated sum insured of all locations and the total premium of the policy.
- ***Top location profile: Each policy is understood as one risk***. But the risk profile contains the sum insured of the largest location and the total premium of the policy.
- ***Location profile: Each location covered by a policy.*** Is understood as a risk and is contained in the profile with a separate sum insured and the part of the gross premium which is allocated to the location.

Policy profiles are not very useful for exposure rating since a fire will not *(generally)* affect more than one location of a policy, i.e. the loss amount per event is limited by the sum insured of the largest location. Top location profiles are much better since the reported sum insured corresponds to the largest possible loss amount. From an underwriter's perspective, location profiles offer the best information because they contain more details than top location profiles.

(NB: Conflagration potentials would need to be added to per location profile results. Any policy level deductibles could be applied to the top location, or to the combined losses expected from the individual locations or risks associated with the multi-location policy)

Source: Riegel, U. (2010). On fire exposure rating and the impact of the risk profile type. ASTIN Bulletin, 40(02):727–777.

Chapter 7: Types of Submissions

- **In-force risk profile (banded)**
  - normally received by 93%, ranked 1 in exposure rating importance
- **Individual risk listing (all cat / non-cat exposures)**
  - normally received by 30%, ranked 3
- **Individual risk listing (above a threshold)**
  - normally received by 48%, ranked 7
- **Primary, E&S, Reinsurer differences**

Orig Sort	Country - Region	Description/Record Index	BUILDING AOI	CONTENTS AOI	TOTAL B&C AOI	TIME ELEMENT AOI	Deductible	State/ Country Region	Zip or Postal Code	Occupancy Code (or description)
1	United States	1 - Apartments with Mercantile Occupancies - Over 30 Units	40,500,000	4,050,000	44,550,000	2,000,000		Alabama		0323
2	United States	2 - Residential Condos without Mercantile Operations	38,000,000	3,800,000	41,800,000	2,000,000		Alabama		0331
3	United States	3 - Non-Governmental Offices and Banks	35,500,000	3,550,000	39,050,000			Arizona		0702
4	United States	4 - Non-Governmental Offices and Banks	33,000,000	3,300,000	36,300,000			Arizona		0702
5	United States	5 - Churches and Synagogues	30,500,000	3,050,000	33,550,000			Connecticut		0900
6	United States	6 - Buildings under Construction	28,000,000		28,000,000		50,000	Connecticut	06928	1150
7	United States	7 - Bakeries	25,500,000		25,500,000	1,125,000	25,000	Illinois	62999	2200
8	United States	8 - Multiple Occupancy Mercantile	23,000,000		23,000,000	450,000	5,000	Illinois	62999	0582
9	United States	9 - Waste and Reclaimed Materials, including Yard	20,500,000	2,050,000	22,550,000	1,215,000		Wisconsin	54990	1400
10	Australia	10 - Motels and Hotels with Restaurant - Up to 10 Units	2,000,000	500,000	2,500,000	100,000		Sydney		0742

Chapter 9: Historical Profiles

- Increase TIVs over time main reason experience lacks credibility.
- Layer more exposed than prior years
- Traditional approach is to apply exposure adjustment based on total sum insured or premium
- Chapter shows how the use of historic TIV profile could help refine experience rating results compared to standard exposure adjustment

Chapter 9: Adjusting Experience for Changes in Historical Profile

2005							
Low	High	%TIV	TIV in band	Avg TIV	No Risks	% Prem	Premium
0	1,000,000	35%	437,500,000	759,549	576	44.12%	6,562,500
1,000,001	2,000,000	25%	312,500,000	1,554,726	201	24.16%	3,593,750
2,000,001	3,000,000	20%	250,000,000	2,688,172	93	16.47%	2,450,000
3,000,001	4,000,000	15%	187,500,000	3,232,759	58	11.60%	1,725,000
4,000,001	5,000,000	5%	62,500,000	4,166,667	15	3.66%	543,750
Total		100%	1,250,000,000		943	100.00%	14,875,000
2009							
Low	High	%TIV	TIV in band	Avg TIV	No Risks	% Prem	Premium
0	1,000,000	29%	507,500,000	760,870	667	38.71%	7,460,250
1,000,001	2,000,000	20%	350,000,000	1,583,710	221	20.16%	3,885,000
2,000,001	3,000,000	23%	402,500,000	2,630,719	153	19.63%	3,783,500
3,000,001	4,000,000	18%	315,000,000	3,423,913	92	14.06%	2,709,000
4,000,001	5,000,000	10%	175,000,000	4,487,179	39	7.45%	1,435,000
Total		100%	1,750,000,000		1,172	100.00%	19,272,750
2014							
Low	High	%TIV	TIV in band	Avg TIV	No Risks	% Prem	Premium
0	1,000,000	27%	607,500,000	778,846	780	35.90%	8,808,750
1,000,001	2,000,000	22%	495,000,000	1,661,074	298	22.79%	5,593,500
2,000,001	3,000,000	23%	517,500,000	2,640,306	196	19.82%	4,864,500
3,000,001	4,000,000	15%	337,500,000	3,515,625	96	11.83%	2,902,500
4,000,001	5,000,000	13%	292,500,000	4,642,857	63	9.66%	2,369,250
Total		100%	2,250,000,000		1,433	100.00%	24,538,500

Chapter 9: Adjusting Experience for Changes in Historical Profile

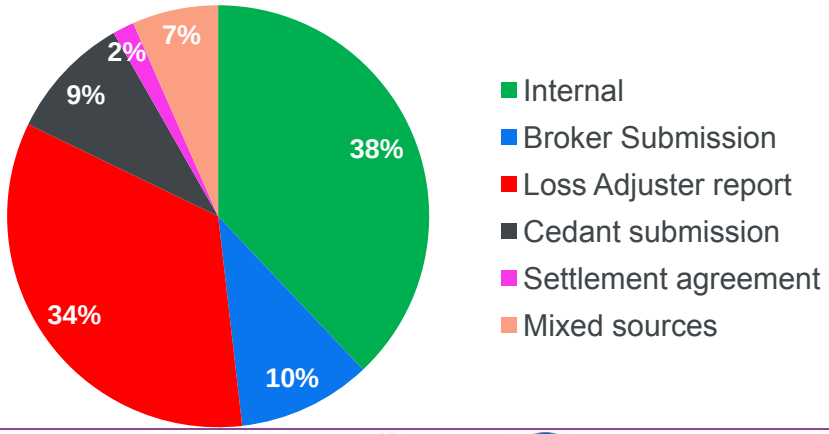
Policy year	On-level premium	Inflation adjusted TIV	Exposure rate using historical profiles	Trended ultimate losses in layer	Burn cost	Exposure adjusted losses With OL Premium	Exposure adjusted losses With adjusted TIV	Exposure adjusted losses With exposure rate in layer
2005	14,427,641	1,380,777,657	1.327%	1,015,706	7.040%	1,865,600	1,839,011	1,621,911
2006	13,509,518	1,725,835,360	1.327%	0	0.000%	0	0	0
2007	16,343,110	1,759,642,147	1.731%	0	0.000%	0	0	0
2008	17,100,229	1,801,187,392	1.731%	646,389	3.780%	1,001,700	897,170	791,663
2009	18,733,394	1,857,660,264	1.935%	0	0.000%	0	0	0
2010	18,592,448	2,049,469,598	1.935%	736,261	3.960%	1,049,400	898,112	806,487
2011	21,119,854	2,133,238,221	1.943%	1,926,131	9.120%	2,416,800	2,257,285	2,101,777
2012	22,383,158	2,215,147,150	1.943%	957,999	4.280%	1,134,200	1,081,191	1,045,360
2013	23,943,359	2,295,225,000	1.943%	0	0.000%	0	0	0
2014	25,274,655	2,444,200,000	2.120%	0	0.000%	0	0	0
2015 (proj)	26,500,000	2,500,000,000	2.120%		842,513	829,744	774,752	707,466
2015 Projected average loss cost excludes 2014					3.179%	3.131%	2.924%	2.670%

Chapter 11: Large Claim Information and Link to AOI

- **Claims and exposures are notoriously difficult to link**
  - but are required for any kind of reliable size-of-loss analysis
- **Data collection**
  - Data sourcing is complicated by the fact that different departments within a company may store different information
- **Data quality and granularity**
  - An important proxy for the exposure would be the TIV at location, however, this is often not available
- **Small sample issues**
- **Integration of data sources**:
  - there is very limited availability of public data sources

Chapter 11: Example: FGU losses

- **(Re) insurers**
  - FGU loss available through a variety of sources, but often in no systematic way
  - Data sourcing / validation can be a long and costly process
- **London market**
  - FGU loss typically not available via Xchanging
- **Illustration:** Asia-Pacific FGU loss data sources across anonymous contributors



Chapter 11: Example: Occupancy classification

- **IICI data snapshot (anonymized figures)**
  - Claims and exposures inflated to 2014 levels to ensure comparability
  - USD as reference currency, but original currency (Ocy) info available
  - Data validated across contributors (London market overlap rate clearly high)

Policy ID	Claim ID	YoA	Ocy	Region	Country	Lloyd's risk code	Occ1	Occ2	Occ3	FGU	TIV	TSI	Narrative
xxx	yyy	2002	MYR	AS	MY	EF	EON	P	19	USD x,x10,344	USD yy,y37,218	USD v,v52,095	CONTAMINATION OF PROPYLENE FOLLOWING LEAKAGE IN HEAT EXCHANGER

- **Refinements**
  - FGU split into PD, BI, TPL, fees often available
  - TIV information still a challenge (both sourcing and anonymization): band, average, median, min/max, top location, etc.

Chapter 11: Some recent data projects

- **London market large commercial risks dataset**
  - Lloyd's syndicates, Insurance Intellectual Capital Initiative (IICI), and Imperial College London
- **Asia-Pacific large commercial risks dataset**
  - SCOR, Hiscox, Liberty, Nanyang Business School, and Imperial College London
- **Fire Protection Agencies**
  - Verisk/ISO and Imperial College London
- **LMA Loss & Exposure Data Working Group**
  - Property & Energy, Cargo & Hull data enrichment strategies
- Limited claims data for some geographical regions
- Linking claims and exposures is a challenge
- Significant heterogeneity by occupancy type & location

Chapter 11: Traditional COPE and Portfolio Extensions

COPE Assessment Matrix (for illustration only)

Commercial / Industrial

		US	Country A	Country B	Country C	Country D	Country E	Country F	Country G
Construction	C		H	M	L		M	M	M
Occupancy	O		L	H		M		H	L
Protection	P			M	M	M	H	M	H
Exposure (e.g. industrial facilities)	E			M	L	H			L
Amount of Insurance	A		M			M	L	H	M
Replacement Costs	R		M	L	H	L	L	H	M
Miscellaneous	M			M		L		H	
Total Indicated (before validation)				H		M	L	L	H

Impact Key *(compared to US)*	
Direction	Worse
	Better
	No difference
Magnitude	H = High
	M = Moderate
	L = Low

1. With US as base, compare each COPE+ attribute
2. Tally up expected impacts and qualitatively weigh them by COPE+ attribute
3. See how compares to actual large loss experience
4. Use same procedure for Ground-up Loss Costs, but include Frequency component – COPE+FARM

Chapter 12: Rate Monitor Information

- Property reinsurance submissions provide limited information about rate changes
- Cedants do not provide examples or explanations of how they calculate rate changes
- Rate changes may not be aligned with historical premium presented
- Paper presents detailed examples of how rate changes should be calculated according to Lloyd's Minimum Underwriting Standards

Chapter 12: Change in layer and in exposure base (relevant loss costs)

		Policy Layer	
		2014	2015
TIV Profile	2014	Loss cost from 2014 pricing (A) ✓	Loss cost for new layer/old profile (B)
	2015	Loss cost for old layer/new profile (C)	Loss cost from 2015 pricing (D) ✓

1) D/A = Change in risk exposure (layer and TIV)
2) D/B = Change in TIV exposure in layer (B may not be practically possible to calculate)
3) D/C = Change due to layer

Next Working Party: Questions – Audience Polling (GIRO)

- **Which line of business should the working party cover next?**
  - Property Cat
  - Crop/Hail
  - **Energy / supply chain**
  - Cyber
  - Autonomous vehicles / drones
  - Motor
  - Liability EL/WC
  - Liability General
  - Liability Professional
- **Would continue to want mix of actuaries, underwriters, academics, engineers as needed with geographic and expertise dispersion**

Questions

Questions

Comments

Speaker Bios

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John Buchanan, FCAS, MAAA, is a principal in charge of ISO's Excess and Reinsurance Division. He has over 30 years of experience as a front-line pricing actuary and consultant in the US, London, and other international reinsurance marketplaces.

In John's career, he has conceptualized, developed and implemented extensive benchmarking and modeling services for various reinsurers, excess carriers, primary companies, and industry groups. He has pioneered extensive work to extend information gathered in mature benchmarking markets, and extending that information to other International markets making use of local and customized knowledge. He was a frontline sign-off actuary for many domestic and international lines of business. While a consultant, he was also the main contact for many years for the Reinsurance Association of America and the Reinsurance Research Council of Canada as well as having worked extensively with the London and European reinsurance market through the Institute and Faculty of Actuaries in the UK and the Casualty Actuaries in Reinsurance in London.

John's professional accomplishments include recently conceptualizing and leading the joint IFoA/CAS International Pricing Research Working Party industry reference document entitled "*Analyzing the Disconnect Between the Reinsurance Submission and Global Underwriter's Needs*". He has been a moderator and panelist at dozens of US and International industry seminars on property and casualty excess and reinsurance pricing, the underwriting cycle, international benchmarking, etc. He has also been heavily involved with many international meteorological groups including NOAA, UK-Met, GLOBE, ACRE, and chairperson of the CAS Climate Change Student Outreach subcommittee, producing a movie on climate change that was accepted in the environmental category at the Sundance Film Festival. He has been in charge of the reinsurance educational tracks and student program at the annual CARe conference, and previously at the CAS Ratemaking Seminar.

Prior to joining Verisk/ISO, John was a Senior Vice President at Platinum Underwriters (previously St. Paul Reinsurance), a Principal at Tillinghast (now Willis Towers Watson), and a Senior Consultant at KPMG, Peat Marwick. He also has competed as an amateur in the Global Salsa Championships, and is determined to write the book "The Mathematician's Guide to Salsa Dancing".

Chris Boggs

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Christopher J. Boggs joined the insurance industry in 1990. He is currently the Vice President of Education for Insurance Journal's Academy of Insurance.

During his career, Chris has authored more than 300 insurance and risk management-related articles on a wide range of topics as diverse as Credit Default Swaps, the MCS-90, and enterprise risk management. This does not include the seven "e-books" - short, one-topic books covering various insurance and risk management-related subjects - he has written. Additionally, he has written and published six insurance and risk management-related books:

- *The Insurance Professional's Practical Guide to Workers' Compensation: From History through Audit – Second Edition*
- *Business Income Insurance Demystified: The Simplified Guide to Time Element Coverages – Third Edition*
- *Property and Casualty Insurance Concepts Simplified: The Ultimate 'How to' Insurance Guide for Agents, Brokers, Underwriters and Adjusters*
- *Wow! I Never Knew That! 12 of the Most Misunderstood and Misused P&C Coverages, Concepts and Exclusions*
- *Insurance, Risk & Risk Management! The Insurance Professional's Guide to Risk Management and Insurance*
- *Workers' Compensation: How You Can Effectively Answer Your Clients 12 Most Commonly Asked Questions*

Chris was also a main author and reviewer of the recently published joint IFoA-CAS Property Per risk Reference Document "Analyzing the Disconnect Between the Reinsurance Submission and Global Underwriter's Needs"

A graduate of Liberty University with a bachelor's degree in Journalism, Chris has obtained nine professional insurance designations: the Chartered Property Casualty Underwriter (**CPCU**), Associate in Risk Management (**ARM**), Associate in Loss Control Management (**ALCM**), Legal Principles Claims Management (**LPCS**), Accredited Advisor in Insurance (**AAI**), Associate in Premium Auditing (**APA**), Certified Workers' Compensation Advisor (**CWCA**), Construction Risk and Insurance Specialist (**CRIS**) and the Associate in General Insurance (**AINS**).