



CAS/CARe Seminar
Boston - Monday, June 4, 2012

John Buchanan, FCAS, MAAA
ISO – Principal, Reinsurance Division

**INT-3: International Property
Overview Slides**

THE SCIENCE OF RISKSM

1

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Intermediate Track 3 International Pricing Approaches - Property

This session will further extend the benchmark concepts in IT1 to International Property lines of business. Similarities and differences between US and European data sources, curve applications, coverage adjustments and validations will be discussed. This session will include a case study approach to highlighting sensitivities and pitfalls of applying US and other benchmarks in exposure modeling as proxies to other countries. The perspective from a former chief actuary on international claims for Cat and non-Cat will be included.

Moderator / Panelist:

John Buchanan, ISO – Principal, Reinsurance Division

Panelists:

Michael Cane, Guy Carpenter & Company, LLC (London)

Amit Parmar, Guy Carpenter & Company, LLC (London)

Michael E. Angelina, St. Joseph's University - Executive Director

Agenda – IT3

- **Overview** (15 mins – John)
 - Survey of curves available
 - US benchmarking property per risk – Case Study
 - Proxy application to International
- **The Pitfalls of Exposure Rating** (40 mins – Michael / Amit)
 - Some common pitfalls
 - The presentation of exposure data
 - Sensitivity analysis
 - Model choices
- **View from Chief Actuary on International Claims** (15 mins – Mike A)
 - Development issues
 - Other forces at work
- **Questions**

Today's Presentations

Intermediate Track 3 (International Property)



	1	2	3	4	5	6	7	
	Trends						Loss Dev't Factors	
	Ground Up			Excess		Loss Dev't Factors		
	Severity	Freq	Exposure	Severity	Freq	Ground Up	Excess	
Property							IT3-MA	
Casualty								
Specialty								

	8	9	10	11	12	13	14	15
	Rate Changes		Ground-Up Loss Costs	Excess Loss Factors	ALAE	Region/ Hazard/ Subline	Layer Experience/ Exposure	Emergence Testing
	Primary	Reinsurance						
Property			IT3-JB	IT3-JB/MC-AP		IT3-JB	IT3-MC-AP	
Casualty								
Specialty								

	16	17	18	19	20	21	22	23
	External Forces	Loss Ratios			Aggregate Distribution	Industry Macro Application	LOB Redund/Def/ Correlations	Where in the Cycle?
		Primary	Reinsurers	Volatility				
Property	IT3-MA	IT3-MC-AP				IT3-JB		
Casualty								
Specialty								

Property Loss Curves – A Survey

- Lloyd's Scales
- Salzman Scales
- Ludwig Tables
- Various Reinsurer Based Scales
 - Swiss Re, Munich Re, Skandia
- MBBEFD Approximations
 - Stefan Bernegger - Swiss Re
 - Modeling loss severity with distributions from Physics
- ISO - PSOLD
- Plausible curves need to rely on link between losses and their exposed amounts of insurance

Proxy Application of NJ Churches to Germany and Thailand



Case Study – NJ Churches

Religion and Non-Profit / Churches

desc	AOI min	AOI max	Number of Risks	Exp Loss (000s)	Avg Prem
B1	-	100.000	4	2.004	982
B2	100.000	200.000	10	5.010	982
B3	200.000	300.000	17	8.516	982
B4	300.000	400.000	19	13.019	1,344
B5	400.000	500.000	262	225.514	1,688
B6	500.000	600.000	396	407.017	2,015
B7	600.000	700.000	218	258.713	2,327
B8	700.000	800.000	120	160.541	2,623
B9	800.000	900.000	163	241.460	2,905
B10	900.000	1,000.000	328	530.555	3,172
B11	1,000.000	1,100.000	428	747.584	3,425
B12	1,100.000	1,200.000	549	1,026.105	3,665
B13	1,200.000	1,300.000	473	938.831	3,892
B14	1,300.000	1,400.000	255	534.054	4,107
B15	1,400.000	1,500.000	415	912.056	4,309
B126	35,000.000	36,000.000	2	54.981	53,903
B127	36,000.000	37,000.000	2	56.321	55,217
B128	37,000.000	38,000.000	1	28.825	56,520
B129	40,000.000	50,000.000	27	930.473	67,572
Total:			8,513		

Source: Risk distribution based on AIR's Industry Exposure Database
Average premiums estimated from ISO Advisory Loss Costs

NJ Church Case Study – Property Risk Exposure and Loss Linkage

Property Size of Loss - [Commercial Property AOI Group List]

File Edit Options Database Contacts Help

Set Properties Get Parameters View Parameters Get Distribution Layer Back

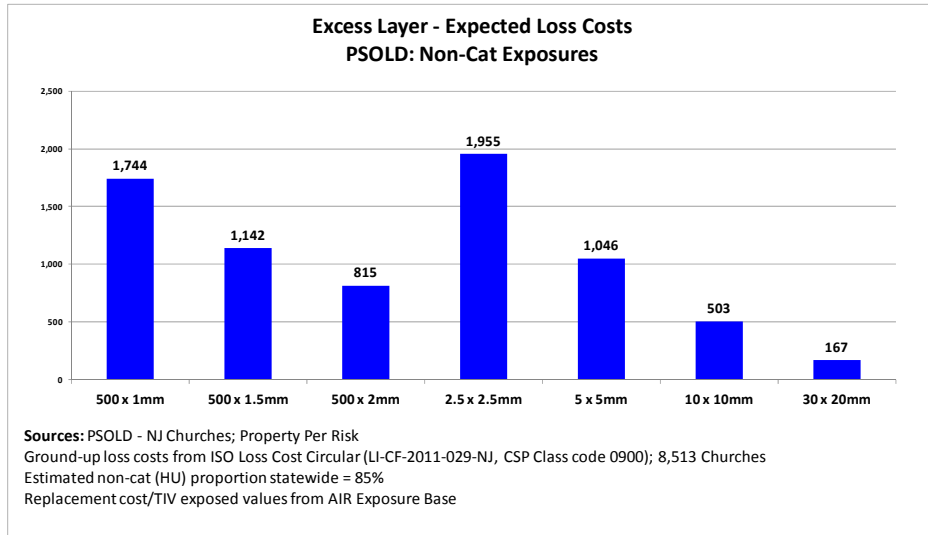
Title: STOCK EXAMPLE

Loss Trend
Trend From: 10/01/2010 Trend To: 07/01/2009 Annual Trend Factor: 1

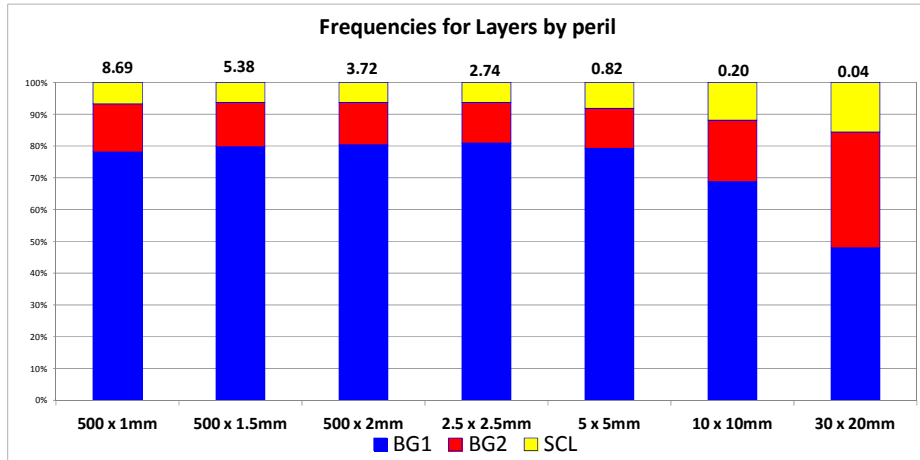
AOI Trend
In-Force Date: 04/01/2012 Avg Policy Date: 12/31/2012 AOI Trend Factor: 1

Description	AOI Min (000s)	AOI Max (000s)	Deductible (000s)	Expected Loss (000s)	PSOLD Excl CAT Occurrence Count	PSOLD-5 Occurrence Count	PSOLD Incl CAT Occurrence Count
Group1	0.001	500.000	NET	2,031.000	1,513,473.4	248,141.8	1,955,242.6
Group2	500.001	1,000.000	NET	1,782.000	280,196.3	61,896.0	387,666.1
Group3	1,000.001	2,500.000	NET	2,541.000	280,946.0	51,682.9	368,347.9
Group4	2,500.001	5,000.000	NET	2,343.000	107,376.3	23,076.0	140,382.6
Group5	5,000.001	7,500.000	NET	1,676.000	41,070.0	8,451.8	63,534.2
Group6	7,500.001	10,000.000	NET	1,285.000	20,987.7	4,211.3	26,997.1
Group7	10,000.001	100,000.000	NET	9,990.000	65,276.4	11,598.8	81,965.2
Combined				21,648.000	2,318,326.1	409,047.6	3,013,535.6

Layer Results – NJ Churches



Frequencies by Peril – NJ Church Validation



NJ Church Case Study Macro Industry Application

Width	Retention	Layer	xCat iBI				# yrs per claim
			Freq	Sev	E[L]	Burn %	
1,000	-		1,561.27	23,796	37,152,656	72.0%	0.00
500	1,000	500 x1mm	8.69	393,573	3,418,628	6.6%	0.12
500	1,500	500 x1.5mm	5.38	416,298	2,238,630	4.3%	0.19
500	2,000	500 x2mm	3.72	429,022	1,597,751	3.1%	0.27
2,500	2,500	2.5 x2.5mm	2.74	1,399,182	3,833,529	7.4%	0.36
5,000	5,000	5 x 5mm	0.82	2,492,138	2,051,759	4.0%	1.21
10,000	10,000	10 x 10mm	0.20	4,839,831	986,781	1.9%	4.90
30,000	20,000	30 x 20mm	0.04	7,723,434	326,902	0.6%	23.63
		total reins	2.74	2,627,520	7,198,971	13.9%	

Proxy – Construction Differentials

Country	City	Parity Range	Exchange Rate	Index Range	Ave. Index
EUROPE					
Austria	Vienna	0.66 - 0.89	0.69 EUR	95.1 - 128.2	111.7
Belgium	Brussels	0.64 - 0.86	0.69 EUR	92.2 - 123.9	108.1
Czech Republic	Prague	11.14 - 15.07	16.86 CZK	66.1 - 89.4	77.8
Denmark	Copenhagen	6.06 - 8.2	5.17 DKK	117.2 - 158.6	137.9
Finland	Helsinki	0.78 - 1.06	0.69 EUR	112.4 - 152.7	132.6
France	Paris	0.77 - 1.04	0.69 EUR	110.9 - 149.8	130.4
Germany	Frankfurt	0.73 - 0.98	0.69 EUR	105.2 - 141.2	123.2
Greece	Athens	0.56 - 0.75	0.69 EUR	80.7 - 108.1	94.4
Ireland	Dublin	0.63 - 0.76	0.69 EUR	90.8 - 109.5	100.2
Italy	Milan	0.64 - 0.87	0.69 EUR	92.2 - 125.3	108.8
Netherlands	Amsterdam	0.61 - 0.83	0.69 EUR	87.9 - 119.6	103.8
Norway	Oslo	6.96 - 9.41	5.43 NOK	128.2 - 173.4	150.8
Poland	Warsaw	1.8 - 2.57	2.89 PLN	62.2 - 88.9	75.6
Portugal	Lisbon	0.39 - 0.56	0.69 EUR	56.2 - 80.7	68.5
Russia	Moscow	24.75 - 35.25	28.95 RUB	85.5 - 121.8	103.7
Spain	Madrid	0.48 - 0.66	0.69 EUR	69.2 - 95.1	82.2
Sweden	Stockholm	8 - 10.83	6.33 SEK	126.4 - 171.1	148.8
Switzerland	Zurich	1.21 - 1.64	0.8 CHF	152.1 - 206.2	179.2
UK	London	0.63 - 0.76	0.61 GBP	103 - 124.2	113.6
AMERICAS					
Brazil	Sao Paulo	1.26 - 1.79	1.61 BRL	78.1 - 111	94.6
Canada	Toronto	0.92 - 1.12	0.99 CAD	93.2 - 113.5	130.4
Mexico	Mexico City	8.54 - 11.55	12.47 MXN	68.5 - 92.6	80.6
USA	Chicago	0.9 - 1.1	1 USD	90 - 110	100
PACIFIC					
Australia	Melbourne	0.9 - 1.21	0.96 AUD	94.1 - 126.5	110.3
China	Shanghai	3.31 - 4.26	6.39 CNY	51.8 - 66.7	59.3
India	Bangalore	18.54 - 25.08	46.23 INR	40.1 - 54.3	47.2
Japan	Tokyo	92.44 - 125.06	77.17 JPY	119.8 - 162.1	141
Malaysia	Kuala Lumpur	1.18 - 1.69	2.99 MYR	39.5 - 56.6	48.1
New Zealand	Auckland	1.14 - 1.62	1.21 NZD	94.5 - 134.3	114.4
Singapore	Singapore	1.06 - 1.3	1.21 SGD	87.7 - 107.5	97.6
Thailand	Bangkok	17.55 - 24.99	30.04 THB	58.4 - 83.2	70.8
UAE	Dubai	2.92 - 3.95	3.67 AED	79.5 - 107.5	93.5

[International Construction Intelligence report from Faithful and Gould.](#)

Proxy - Rating Group Differentials

PSOLD RG #	Rating Group name	Count of CSP	Sum of 20- year Total		Relativity High/Low-20	Relativity High/Low-5
			Claim Count			
1	Apartment/Condo under 10 units	7	72,360			
2	Apartment/Condo over 10 units	8	76,568	1.64	1.74	
6	Hotels and Motels - With Restaurant	4	11,871	2.19	1.91	
7	Hotels and Motels - Other	7	58,438			
15	Other Mercantiles - Retail/Wholesale	4	79,980	1.81	1.78	
16	Other Mercantiles - Other	17	440,504			
25	Agricultural - Greenhouses	1	3,177			
26	Agricultural - Grain Elevators	6	2,982	6.75	5.75	
27	Food Processing - Other	7	16,221			
28	Food Processing - Severe	3	1,324	1.98	2.82	
31	Light Manufacturing - Printing	1	14,274			
32	Light Manufacturing - Other	5	12,551	2.00	2.48	
33	Heavy Manufacturing - Wood	4	23,910	1.48	1.73	
34	Heavy Manufacturing - Other	7	32,300			
36	Highly Protected Risks - Low	17	4,453			
37	Highly Protected Risks - Medium	15	7,950	2.47	1.66	
38	Highly Protected Risks - Heavy	46	4,703	8.28	5.41	

German Church Layers – Illustrative Macro Industry Application

German Churches - using NJ as proxy - 98K - scalar 0.8

PSOLD results - Stability

Label	Incl/Excl in Tot	Layer Width (000s)	XS	Retention (000s)	Subject Premium (000s)	Limited Severity	PSOLD Excess Claim Count	Layer Average Severity	non-CAT Reinsurance Premium (000s)
Sub1	<input type="checkbox"/>	500	XS	1,000	695,322	1,460	96.13	389	37,442
Sub2	<input type="checkbox"/>	500	XS	1,500	695,322	934	58.19	412	23,952
Sub3	<input type="checkbox"/>	500	XS	2,000	695,322	652	39.34	425	16,709
Re1	<input checked="" type="checkbox"/>	2,500	XS	2,500	695,322	1,525	28.37	1,379	39,104
Re2	<input checked="" type="checkbox"/>	5,000	XS	5,000	695,322	799	8.33	2,460	20,478
Re3	<input checked="" type="checkbox"/>	10,000	XS	10,000	695,322	359	1.98	4,636	9,191
Re4	<input checked="" type="checkbox"/>	30,000	XS	20,000	695,322	92	0.36	6,629	2,364
Total		27,500	XS	2,500	695,311	2,775	28.37	2,607	71,137

Thailand Church Layers – Illustrative Macro Industry Application

Property Size of Loss - [Layer]

File Edit Options Database Contacts Help

Thailand Churches (Congregations/Temples) - 43K - AOI Trend 0.5 - scalar 1.5

PSOLD results - Stability

Label	Incl/Excl in Tot	Layer Width (000s)	XS	Retention (000s)	Subject Premium (000s)	Limited Severity	PSOLD Excess Claim Count	Layer Average Severity	non-CAT Reinsurance Premium (000s)
Sub1	<input type="checkbox"/>	500	XS	1,000	260,972	1,979	43.82	395	17,328
Sub2	<input type="checkbox"/>	500	XS	1,500	260,972	1,263	26.82	412	11,054
Sub3	<input type="checkbox"/>	500	XS	2,000	260,972	861	18.00	419	7,535
Re1	<input checked="" type="checkbox"/>	2,500	XS	2,500	260,972	1,822	12.55	1,272	15,953
Re2	<input checked="" type="checkbox"/>	5,000	XS	5,000	260,972	906	3.18	2,495	7,931
Re3	<input checked="" type="checkbox"/>	10,000	XS	10,000	260,972	396	0.75	4,636	3,467
Re4	<input checked="" type="checkbox"/>	30,000	XS	20,000	260,972	150	0.14	9,118	1,317
Total		27,500	XS	2,500	260,973	3,274	12.55	2,284	28,668