

**PAST CAS QUESTIONS ASSOCIATED WITH THE
CURRENT EXAM 6 SYLLABUS READING
AN EXPOSURE RATING APPROACH TO PRICING
PROPERTY EXCESS-OF-LOSS REINSURANCE**

Questions from the 1996 Exam:

34. (4 points)

You are given the following information:

Cumulative Loss Cost Distribution by Percent of Insured Value

Loss as a Percent of Insured Value	Fire	"All Other"
10%	.325	.810
25%	.460	.873
50%	.623	.920
75%	.746	.948
100%	.845	.969
125%	.918	.984
150%	.968	.993
175%	.992	.998
200%	1.000	1.000

Distribution of Direct Premium by Policy Limit

Limit	Premium
\$50,000	\$200,000
\$100,000	\$200,000
\$250,000	\$200,000
\$500,000	\$200,000
\$1,000,000	\$200,000

Distribution of Historical Losses by Cause of Loss

Fire	35%
Wind	15%
Hurricane Hugo	0%
"All Other"	35%
Liability	15%

- * Pure loss component of the direct premium is 60%.
- * Primary rates are 10% inadequate.
- * Reinsurer will share the cost of ALAE.
- * ALAE is 5% of loss.
- * Reinsurer profit is 10%.
- * Indicated "exposure premium" for wind is \$4,000 for the layer \$500,000 excess of \$500,000.

Referring to Ludwig, "An Exposure Rating Approach to Pricing Property Excess-of-Loss Reinsurance," respond to the following with respect to pricing homeowners property excess of loss reinsurance for the layer \$500,000 excess of \$500,000:

- A. (1 point) What is the indicated "exposure premium" for fire?
- B. (1 point) What is the indicated "exposure premium" for "All Other"?
- C. (1 point) Using Salzman's methodology, calculate the indicated exposure rate.
- D. (1 point) Using Ludwig's methodology, calculate the indicated exposure rate.

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Solutions to Questions from the 1996 Exam:

Question 34

A and B.

Exposure Rating Example: \$500,000 Excess of \$500,000 Layer

Givens:			Exposure Rate Assumptions:	
Ceding Co. Retention:	500,000		Expected loss component	0.60
Reinsurance Limit:	500,000		ALAE load	1.05
Cumulative Loss as a Percentage of Insured Value			Rate adequacy adjustment factor 1.0/.90	1.11
<u>% of value</u>	<u>Fire</u>	<u>All other</u>	Expense and profit load	0.10
10.0%	0.325	0.810		
25.0%	0.460	0.873		
50.0%	0.623	0.920		
75.0%	0.746	0.948		
100.0%	0.845	0.969		
125.0%	0.918	0.984		
150.0%	0.968	0.993		
175.0%	0.992	0.998		
200.0%	1.000	1.000		

		Coverage A		Direct
		<u>Limit</u>	<u>Premium</u>	<u>Premium</u>
		(1)	(2)	(2)
		50,000	200,000	
		100,000	200,000	
		250,000	200,000	
		500,000	200,000	
		1,000,000	200,000	

Cause of Loss: Fire

Compute:		Ceding Co.	% Allocation	Retention +	% Allocation	Exposure	Exposure
Coverage A	Direct	Retention as	of Total	Limit as	of Total	Factor	Premium
<u>Limit</u>	<u>Premium</u>	a % of Cov. A	Premium	a % of Cov. A	Premium	(6) - (4)	(2) * (7)
(1)	(2)	(3)	See Table above	(5)	See Table above	(7)	(8)
50,000	200,000	1000%	100.0%	2000%	100.0%	0%	0
100,000	200,000	500%	100.0%	1000%	100.0%	0%	0
250,000	200,000	200%	100.0%	400%	100.0%	0%	0
500,000	200,000	100%	84.5%	200%	100.0%	16%	31,000
1,000,000	<u>200,000</u>	50%	62.3%	100%	84.5%	22%	<u>44,400</u>
	1,000,000						75,400

Column 3 = Ceding Co. Retention / Column 1.
Column 5 = Reinsurance Limit / Column 1.

Cause of Loss: All Other

Compute:		Ceding Co.	% Allocation	Retention +	% Allocation	Exposure	Exposure
Coverage A	Direct	Retention as	of Total	Limit as	of Total	Factor	Premium
<u>Limit</u>	<u>Premium</u>	a % of Cov. A	Premium	a % of Cov. A	Premium	(6) - (4)	(2) * (7)
(1)	(2)	(3)	See Table above	(5)	See Table above	(7)	(8)
50,000	200,000	1000%	100.0%	2000%	100.0%	0%	0
100,000	200,000	500%	100.0%	1000%	100.0%	0%	0
250,000	200,000	200%	100.0%	400%	100.0%	0%	0
500,000	200,000	100%	96.9%	200%	100.0%	3%	6,200
1,000,000	200,000	50%	92.0%	100%	96.9%	5%	<u>9,800</u>
	1,000,000						16,000

Column 3 = Ceding Co. Retention / Column 1.
Column 5 = Reinsurance Limit / Column 1.

c. The Salzmann method considers the fire cause of loss only when computing the indicated exposure rate.

$$\begin{aligned}
 \text{Exposure Rate} &= \frac{\text{Exposure premium} * \text{ELR} * \text{ALAE Load}}{\text{Total Premium}} * \text{Rate adequacy factor} * \text{Expense \& profit load} \\
 &= \frac{\$75,000 * .60 * 1.05}{1,000,000} * 1.1 * \frac{1.0}{(1.0 - .10)} = .0586
 \end{aligned}$$

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Solutions to Questions from the 1996 Exam:

Question 34 (continued)

- d. Ludwig's methodology produces a final exposure rate by weighting the exposure rates (for fire, wind, other property, and liability) by the percentage weights (from a company's historical distribution of homeowners losses by cause of loss). See pages 127 - 131.

Note: the question provides an indicated "exposure premium" for wind, and not an exposure rate. Thus, for the purpose of answering this question, a weighted exposure premium will be computed and used to determine a final exposure rate.

<u>Cause of Loss</u>	<u>Loss Weights</u>	<u>Exposure premium</u>
Fire	35%	75,400
Wind	15%	4,000
Hurricane Hugo	0%	0
"All Other"	35%	16,000
Liability	15%	0
Weighted exposure premium		75,400*.35+4,000*.15+16,000*.35=32,590

$$\begin{aligned}
 \text{Exposure Rate} &= \frac{\text{Exposure premium} * \text{ELR} * \text{ALAE Load}}{\text{Total Premium}} * \text{Rate adequacy factor} * \text{Expense \& profit load} \\
 &= \frac{\$32,590 * .60 * 1.05}{1,000,000} * 1.1 * \frac{1.0}{(1.0 - .10)} = .025094
 \end{aligned}$$