



Risk Based Fire Underwriting – A State of the Art Approach

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Presented by _____



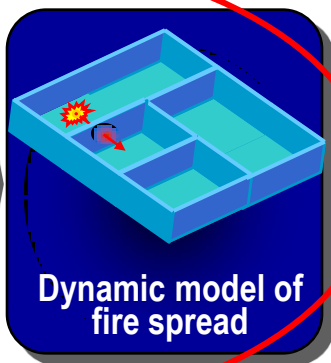
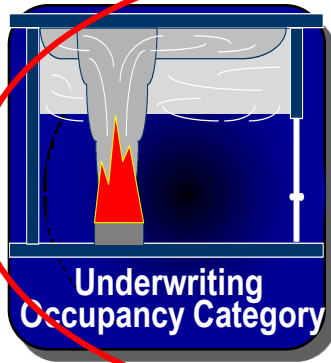
Overview of the Account Fire Model

Enhancing Underwriting Decisions

- The AFM informs the key pillars of the account underwriting process

Risk Selection	Efficiency	PML Analysis Capabilities	Technically Sound Methodology
<u>Consistent</u> technical base rate calculation	Large accounts take minutes to analyze; quote generation is fast, yielding higher production	Classic loss scenarios (PML, NLE, MFL) included in standard AFM output	AFM built on first principals of fire ignition and development
<u>Granular</u> risk segmentation (>1 million combinations) compared to 1,000 for standard industry methods	Simple to adjust policy terms and analyze impact in ground-up, gross and net loss positions	Return periods assigned to classic scenarios establish annual frequency of a PML occurrence	Applies state of the art fire modeling and the best statistical data available
<u>Competitive</u> rates in the current market	Ability to transfer accounts from existing RMS exposure database (i.e. hurricane and earthquake EDMs)	Consistent calculation of classic loss scenarios	Utilized fire protection engineering firms and fire department chiefs as consultants during development for key issues
<u>Calibrated</u> to >\$1 billion in claims	Uses standard COPE data commonly captured by insurers. Where data are unknown, AFM databases populate with "Smart Unknowns"	Analytical views on cost-benefit of risk transfer layering strategies	Directly linked to building codes, building fire safety design and insurance risk engineering practices

Decision Support Methodology



***Rigorous fire simulations of
minor to catastrophic events***

***Match account-location
exposure to simulations***

Occupancy profiling establishes the hazard for the underwriter.

Linked to building codes, design and loss control engineering

Fire start and spread are function of profile

Sprinkler & FD performance by zip code

Impaired protection - PML event risk quantified

Where is the exposure – zip code?

What is TIV

Occupancy, construction, sprinklers, alarms?

Fire spread drives building / contents damage

BI following damage?

Impaired protection -PML event risk quantified

Technical price?

Deductible?

Excess layer AAL?

Frequency of PML event & loss amount

Risk Segmentation

Fire Risk Driver	Typical Rating Approach	Account Fire Model Rating Granularity
Occupancy	Use ~9 hazard grades	Use 32 underwriting occupancy class profiles (UOCs), with sub-profiles by size
Construction	Use 6 unique types	Use 6 unique types
Sprinkler Protection	Yes or No	Yes, No or Unknown*
Fire Department Effectiveness	10 protection classes (most insurers apply on average 4 factors)	8 RMS derived ratings at zip code level based on national data pertaining to response time and effectiveness
Number of Stories	Not addressed	From 1 to 40 stories (3 bands typical by occupancy)
Year Built	Not addressed	4 ranges that address key building code issues related to fire growth
24/7 Alarm Monitoring	Not addressed	Yes, No or Unknown*
Square Footage	Not addressed	Calculated uniquely for any value input (6 bands typical by occupancy)
Based Rates Produced	~1,000	>1 million

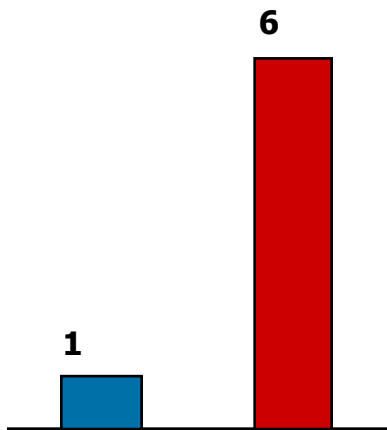
* Unknowns for a variety of parameters are automatically populated by AFM zip code level databases known as "Smart Unknowns"

Risk Differentiation

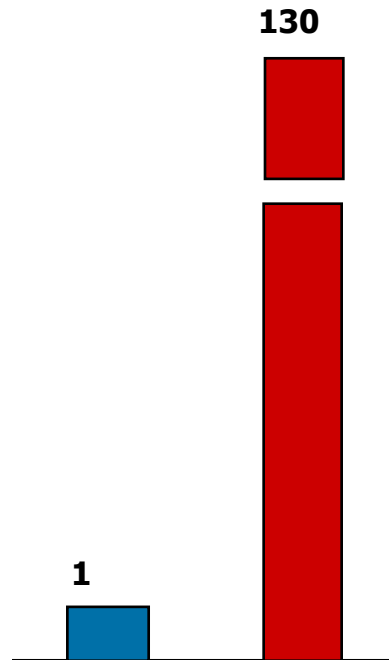
AFM difference in 'pure premium' based on common risk attributes

 Sprinklered  Non-sprinklered

Case 1
Warehouse "average"
in all respects



Case 2
Best case, with
sprinklers vs.. worst-case, with no
sprinklers

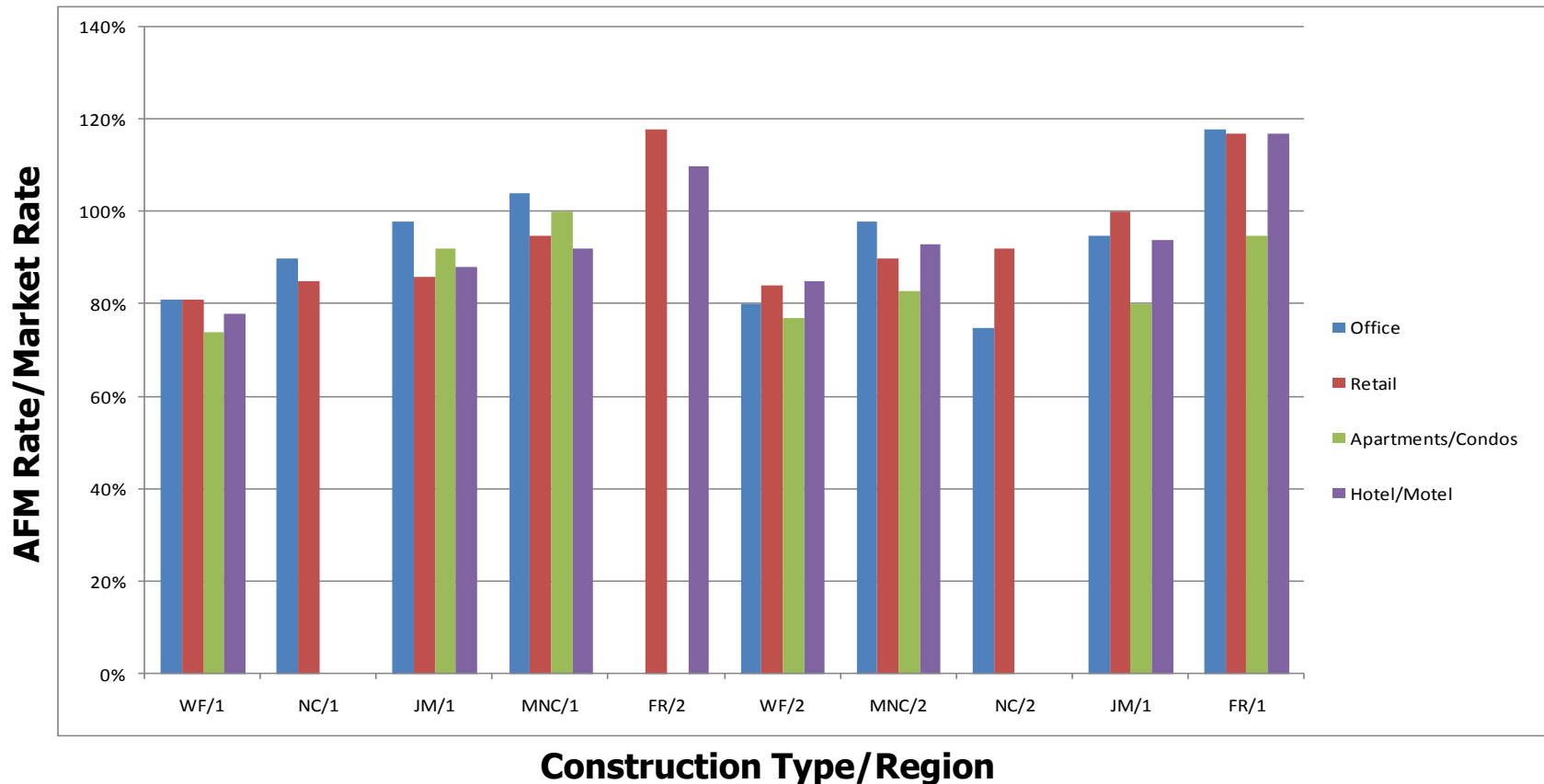


Case 3
Worst-case, with sprinklers vs..
best-case, with no sprinklers



AFM Comparison to Market Rates

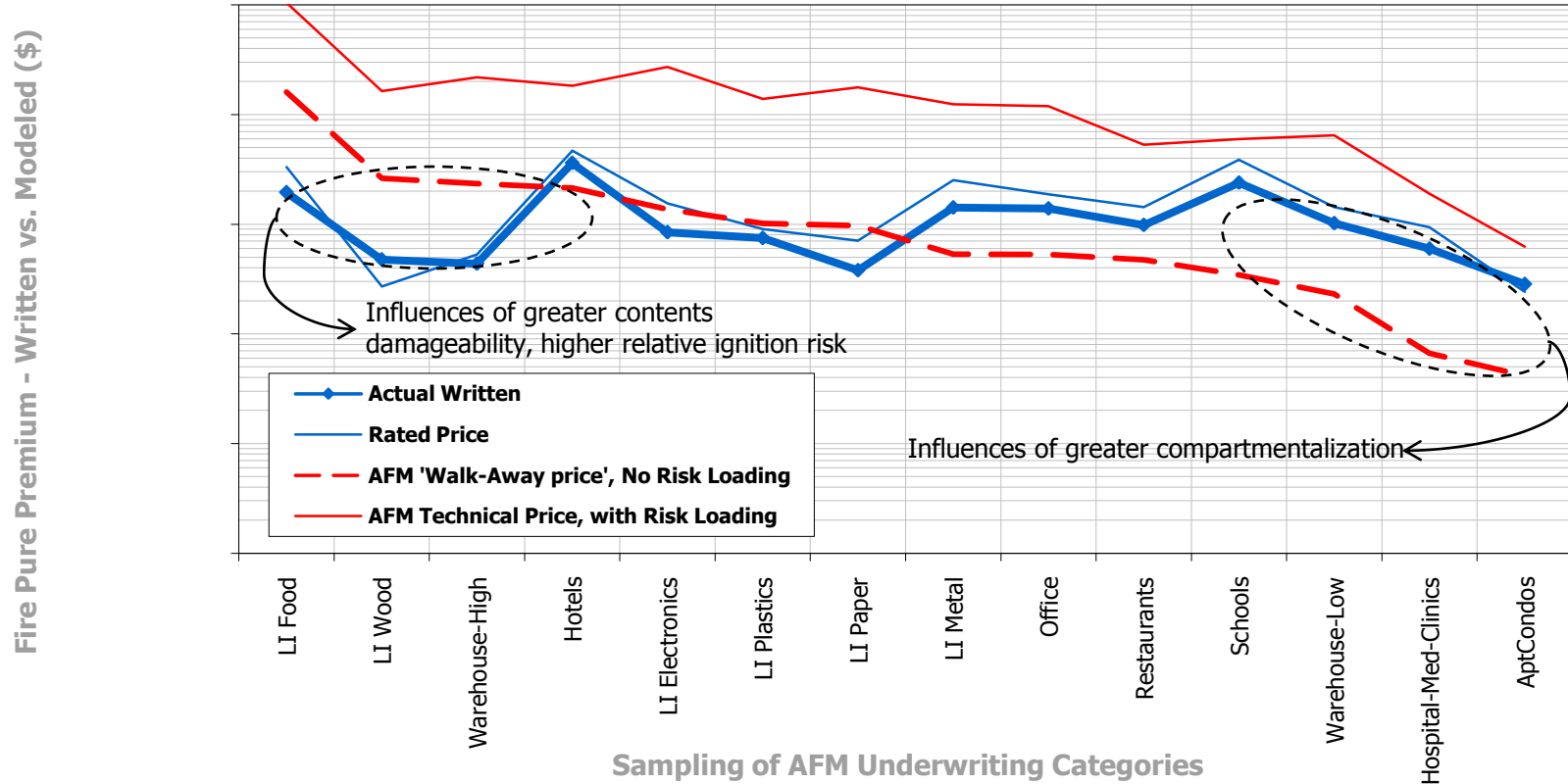
- Chart below displays a client comparison of market rates to AFM risk loaded rates for specific geographic regions and occupancies
 - Comparison varies from -26% to +18%
 - Illustrates the AFM transparency and consistency as a competitive rating tool that can aid in finding market opportunities



Support Transparent Adequate Technical Pricing

Review of Premium Adequacy - By Occupancy

Aggregated Primary Insurer Results: Written vs. Rated vs. AFM



- Sampled company rating methods tend to under or over price technical risk
 - Risk loading for adequate technical price is not systematic nor consistent
- Compared to historical premium written, discipline in adhering to rated price tends to be lacking

AFM Underwriting Occupancy Category (UOC)

- AFM occupancy type profiles take into account a wide variety of occupancy driven issues, which dictate fire risk such as fire growth, compartmentation, ignition frequency, etc.
 - 32 AFM v1.0 UOCs cover >80% of the standard commercial fire market (color coded by hazard group below)
1. Office
 2. Retail Trade - Average Challenge Hazard
 3. Retail Trade - High Challenge Hazard
 4. Retail - Warehouse
 5. Restaurant
 6. Houses of Worship
 7. Hotel/Motel
 8. Apartment/Condo
 9. Primary and Secondary Schools
 10. Universities & Schools - Admin Use
 11. Universities & Schools - Dorm Use
 12. Universities & Schools - Academic Use
 13. Libraries
 14. Medical - Hospital Building
 15. Medical - Clinic & Medical Offices
 16. Medical - Stand Alone - Nursing Home
 17. Medical - Lab, Diagnostics & Operation Rooms
 18. Medical - In Patient Rooms
 19. Light Ind. Manufacturing - General
 20. Light Ind. Manufacturing - Wood
 21. Light Ind. Manufacturing - Textiles
 22. Light Ind. Manufacturing - Paper
 23. Light Ind. Manufacturing - Pharmaceutical
 24. Light Ind. Manufacturing - Metal
 25. Light Ind. Manufacturing - Plastic
 26. Light Ind. Manufacturing - Printing
 27. Light Ind. Manufacturing - Electronics
 28. Light Ind. Manufacturing - Food
 29. Light Ind. Manufacturing - Beverage
 30. Warehouse - Low Challenge Hazard
 31. Warehouse - Medium Challenge Hazard
 32. Warehouse - High Challenge Hazard

Summary

■ The AFM represents

- A decision support tool for delivering enhanced transparency and consistency to the account underwriting process
- A highly granular understanding of commonly known drivers of fire risk determines adequate technical pricing
- Increased submission through-put while reducing “underwriting leakage” through contribution of all account locations to the pure premium calculation
- Quantification of the frequency of *severity losses* for informed views on account selection and layer pricing



Ironshore Insurance

An Approach to Underwriting Fire

Ironshore – Company Overview

- Specialty insurer formed in late 2006 with \$1.0 billion of capital
- Management led by Kevin Kelley (formerly of Lexington)
- Diversified business profile across targeted segments – 60% casualty / 40% property
- Worldwide access to specialty business with established platforms in the U.S., Bermuda and Lloyd's
- Ability to write U.S. business on an admitted and E&S basis
- Financial strength rating of A- (Excellent - Stable) by A.M. Best
- More than 250 employees in 11 offices in the U.S., U.K., Canada and Bermuda



Ironshore Objectives Using AFM

- Risk selection – differentiate among risks; test deductibles
- Pricing – compare model results with traditional u/w methods
- Portfolio profitability – identify pockets of strength and weakness
- Loss history – Ironshore 2½ years old...leverage industry data
- Overriding principle – AFM is a TOOL, not an answer...it is a RESOURCE for underwriters to supplement their experience and judgment



Pricing Illustration

Account Characteristics		Fire Modeling Results	
Total Insured Value:	\$20m	Layer Activation Probability	90%
Layer:	\$20m Primary	Layer Exhaustion Probability	0%
Fire Deductible:	\$10,000	Ground-up Fire Loss Cost Rate	0.02%
Occupancy:	Apartment/Condo	Fire AAL	5,000
Construction:	Wood Frame	Fire Standard Deviation	66,667
Fire Department Rating:	A-B	Modeled Fire Price	15,000
Number of Buildings:	4		
Area:	300,000 sq. ft	Price Adequacy	
Number of Stories:	Unknown	Modeled Fire Price	15,000
Sprinklered:	Unknown	Modeled Cat Price	20,000
Remote Alarm:	Unknown	Modeled Total Price	35,000
		Offered Premium	50,000
		Offered vs Modeled%	143%
		Allocation of Premium to Fire / Cat	
		Model Suggested	43% / 57%
		Underwriter Suggested	20% / 80%

- Compare modeled frequency and severity vs. historical experience
- Generate objective benchmark price
- Test sensitivity of loss cost and price to deductibles, etc.
- Complements cat model – transparent and consistent allocation of premium



Profitability by Occupancy

- Analyzed 250+ accounts
- Used hypothetical pricing formula based on standard deviation
- Compared actual fire premium with modeled fire price

Occupancy	TIV Analyzed (\$B)	Modeled Fire AAL (\$'000)	Modeled Fire Price (\$'000)	Actual Fire Premium (\$'000)	Actual vs Modeled %
Apartment/Condo	49	157	464	912	197%
Office	126	562	1,541	1,469	95%
Hotel	47	319	719	558	78%
Retail Trade - Average Challenge	67	139	586	691	118%
Primary and Secondary Schools	90	641	952	1,031	108%
All Other	212	1,475	3,972	3,556	90%
Portfolio Total	592	3,293	8,234	8,218	100%

- Drives discussion on how we think about rates -- compare with u/w view
- Do we need to charge more for hotels? Should we write more apartments?



Comparison by Construction

Apartments/Condominiums

Construction	TIV Analyzed (\$B)	Modeled Fire AAL (\$'000)	Modeled Fire Price (\$'000)	Actual Fire Premium (\$'000)	Actual vs Modeled %
Wood Frame	27	61	178	335	188%
Joisted Masonry	4	58	155	355	229%
Fire Resistive	4	15	55	109	199%
All Other	14	23	76	114	149%
Portfolio total	49	157	464	912	197%

- Deeper dive into one occupancy...does price strength depend on construction?
- Are the results realistic or do we need to improve our data, adjust the model...?



Risk Selection

Urban Area Wood Frame Apartment Building

Sprinklered	Remote Alarm	# Stories	Fire Department Rating	Pricing Rate*
Unknown	Unknown	Unknown	A	0.13%
Y	Y	3	A	0.06%
N	Y	3	A	0.15%
N	N	3	A	0.20%
N	N	1	A	0.32%
N	N	1	H	0.41%

- Reinforces importance of data quality – helps prioritize improvement efforts
- Helps us benchmark against traditional debit/credit approach

* Illustration Only



Question & Answer