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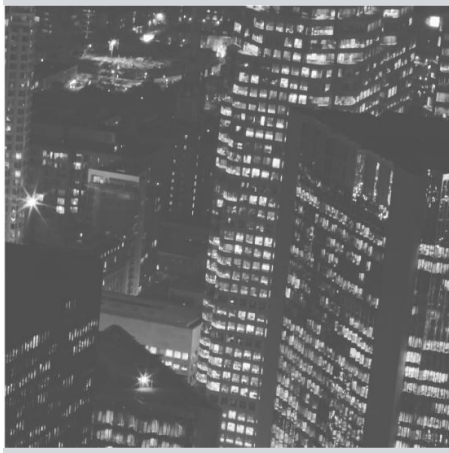


Managing Corporate Fire Risk Tolerance against Severity Loss Frequency

RMS® Account Fire Model

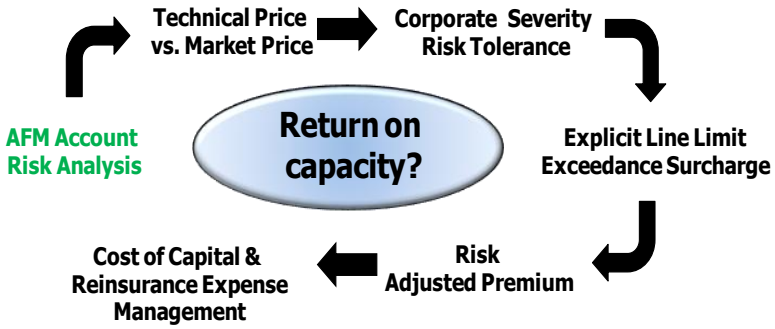
RMS®

Managing Severity Risk with the RMS Account Fire Model

In the traditional approach to fire underwriting, account underwriters manage severity risk by adhering to management guidelines that set the retention limit for a single fire loss. Limits are typically expressed in terms of a probable maximum loss (PML) underwriting scenario event. Underwriting scenario events such as the PML event are a mainstay in assessing account acceptability, risk tolerance, and optional risk transfer. Similarly, the PML acts as a gauge of large loss severity risk through a "PML payback" analysis in which a payback period (in years) is calculated by dividing the account PML by the expected premium.

However, the traditional approach to underwriting fire risk lacks important decision-making criteria—it ignores the PML occurrence frequency. Two accounts possessing a similar PML estimate may not necessarily present a similar underwriting risk. The Account Fire Model adds the PML occurrence frequency to the decision-making process, providing a new perspective that enables underwriters to more accurately analyze the risk posed by each account. Underwriters can now set technical premiums that are adjusted for the account's large loss severity risk, derived from a detailed analysis of the account and based on readily available exposure data. The technical premium estimate generated by the model not only considers PML frequency and loss, but incorporates account-specific attributes such as occupancy, construction, and fire department response.

Using risk metrics from an analysis, underwriters can quote a risk-adjusted technical premium that is directly linked to corporate retention risk tolerance and can be tested against return on cost-of-capital targets and reinsurance expense management. This "severity risk-adjusted" technical premium represents the minimum adequate premium when accounting for the risk of a PML occurrence.



Analyzing Risk Tolerance and Severity Risk

Traditionally, underwriters gauge the acceptability of retained risk by comparing the account's PML value to a prescribed retention line limit. Based on these criteria alone, accounts with similar values would be viewed similarly when evaluating adherence to the company's risk tolerance as defined by the line limit. However, underwriters can improve risk management practices by explicitly considering both the PML loss and its occurrence frequency in the technical premium calculation. The Account Fire Model forms the basis for a new decision paradigm: transparently linking retained risk to the technical adequacy of the premium the market is willing to pay.

This new paradigm is achieved through an underwriting ratio, defined as the amount of premium for every $1 loss, assuming the PML event occurs and is the only loss paid out. An underwriting ratio of 1.0 implies a break-even; that is, for every $1 of PML paid, $1 of premium is required. The underwriting ratio captures two account-level views on adequate risk loaded premium: (1) the account underwriter's assessment of the going market price; and (2) risk of a loss exceeding the retention line limit.

Both views consider the company tolerance for a severity loss, which is measured using an acceptable underwriting ratio:

Acceptable Underwriting Ratio = Technical Premium / (Line Limit / Return Period on Line Limit)

Underwriting management sets the line limit and return period on line limit to define the risk of an acceptable loss, or larger, occurring during the policy period, and may vary by factors such as occupancy, protection status, or geographic location.

The severity risk associated with an account is measured by a second underwriting ratio, the market underwriting ratio, which is defined as:

Market Underwriting Ratio = Market Price / (Account PML / Account PML Return Period)

If the market underwriting ratio is greater than the acceptable underwriting ratio, then the premium collected from the market is adequate to compensate for expected frequency claims and the risk of a large-loss severity claim.

Calculating Adequate Technical Premium

The account-level views captured by the underwriting ratio are linked to an adequate technical premium of the Account Fire Model analysis, calculated as:

Average Annual Loss + (Risk Load Factor * Standard Deviation)

which captures the average annual risk of experiencing a loss. This forms the basis for assessing a severity surcharge to compensate for the risk of a claim exceeding the line limit once during the return period of the PML. The modeled technical premium also provides a new paradigm for evaluating the cost effectiveness of transferring risk to a third party.

A positive surcharge suggests that the underwriter quote a higher premium, as the market price does not adequately cover the severity risk. On the other hand, a negative surcharge indicates that the market price is greater than the severity-weighted technical premium, thus implying that the retained exposure is within company risk tolerance, and as such, the underwriter can strategically quote lower as competition dictates.

This risk-pricing approach is illustrated by the example below. Because Account A and Account B have similar PML estimates—$60 million and $59 million, respectively—the two accounts would be viewed similarly based on PML in the traditional underwriting approach. However, when considering the loss event likelihood, it becomes apparent that Account A, with a return period of 1,150 years, presents a 350 percent greater risk than Account B, with a return period of 3,750 years. The Account Fire Model takes this greater severity risk into consideration when calculating the technical premium for Account A.

Calculating Severity-Weighted Technical Premium using the RMS Account Fire Model				
Account		**A**	**B**	**C**
Management's Risk Tolerance Protocol	Underwriter Line Limit ($)	15,000,000	15,000,000	15,000,000
	Line Limit Return Period (Years)	500	500	500
	Third-party or Account Fire Model PML ($)	60,000,000	59,000,000	6,000,000
	Account Fire Model PML Return Period (Years)	1,150	3,750	150
Market View	Market Price ($)	1,500,000	1,000,000	750,000
Premium Quote	Severity Risk Surcharge on Market Price ($)	239,130	-650,000	350,000
	Severity Weighted Technical Premium ($)	1,739,130	350,000	1,000,000

The severity-weighted technical premium for Account A reflects this greater risk of PML occurrence with a corresponding $239,130 severity risk surcharge. Given its lower risk, the underwriter could reduce the premium quote for Account B by as much as 45% and adequately cover the risk.

This decision support requires management to refine its retention risk tolerance by assigning an acceptable frequency of exceeding a line limit in terms of a loss event return period. Changing the underwriting line limit or the corresponding line limit return period will increase or decrease the severity surcharge.

The traditional view of PML risk would also suggest that Account C would be more attractive to write because its PML loss estimate, at $6 million, is 10 times lower than Accounts A and B. However, due to the difference in PML occurrence return period compared to the insurer's risk tolerance, Account C's market underwriting ratio is lower than its acceptable underwriting ratio. A $250,000 surcharge is required to compensate for the greater risk being assumed while adhering to company risk tolerance as expressed by the line limit retention and corresponding frequency of exceedance.

As illustrated in this example, the Account Fire Model methodology can explicitly link account underwriting decisions to severity risk and frequency risk. In order for management to control the accumulation of severity risk retained across a portfolio of otherwise uncorrelated accounts, it must also think of the underwriting retention limit in terms of a frequency of exceedance. Doing so permits the explicit underwriting of account severity risk against insurer risk tolerance embodied in its retention line limits. Model results can be evaluated against the traditional financial calculations to evaluate the cost effectiveness of committing capacity and third-party risk transfer expense when binding the account at a premium acceptable to the market.