RMS WHITE PAPER

THE RMS METAMODELER™

Own Your View of Risk

RMS

Executive Summary

Many RMS clients take steps outside of modeling applications to develop their own view of risk—running sensitivity tests, adjusting model loss, and blending model output. Until RMS(one), catastrophe models have not offered insurers and reinsurers the ability to develop their own view of risk, tailored to their guidelines and representative of all exposures.

The ability to flexibly investigate modeling assumptions, improve the understanding of uncertainty and portfolio sensitivities, and combine losses from numerous sources leads to better business decisions, more efficient use of capital, and ultimately a more resilient risk management strategy. It is no longer enough to have a "one size fits all" approach to risk modeling—our clients need to be confident that their view of risk reflects the uniqueness of their portfolios. Finally, insurance regulators and supervisors increasingly require companies to demonstrate that they fully understand the modeling basis for their submissions.

The RMS(one)™ environment supports (re)insurers in developing their own view of risk, by delivering "open modeling" through the RMS MetaModeler™. Clients can incorporate their own research and experience into their modeling; manage model change; prepare market submissions; and meet their regulatory obligations in an efficient, transparent, and documented way.

Open modeling increases model understanding, enabling our clients to customize RMS models by adjusting or overriding model components and data. Clients can host their own models in the RMS(one) environment—as well as non-RMS models and model results—and can blend model output.

Through this suite of open modeling capabilities, RMS(one) enables clients to make defensible, transparent, auditable changes to their models and model output in one efficient experience. By gaining control over model assumptions, clients can develop a tailored, complete view of risk at all organizational levels. For the first time, they can confidently validate model applicability on a single platform and can test and modify model assumptions, data, and components, bringing resiliency to their risk management strategy.

One Size Does Not Fit All

Every insurance and reinsurance portfolio is unique; no two RMS clients write the same risks. Clients have different underwriting and business strategies, loss histories, claims experiences, and capital management approaches, based on many sources of risk intelligence. RMS believes their catastrophe modeling solutions should be flexible enough to reflect these differences. RMS(one), using the MetaModeler and RMS Analytics™, brings resiliency to a (re)insurer's risk management strategy, allowing companies to build, analyze, and visualize their view of risk based on the sources they choose. The RMS MetaModeler is a dynamic, efficient environment, powered by the RMS Cloud, to enable RMS clients to create the view of risk that is right for them.

RMS MetaModeler: Build Your View of Risk

Currently (re)insurers who want to create their own view of risk must perform this "tailoring" activity outside the modelers' software, and have limited options to make exposure and loss adjustments. While this may generally achieve the fundamental aim of creating a company's own view of risk, it is very often a time-consuming, manual, and inefficient process; many of these modifications are in fact workarounds. Today, users might modify their losses because they believe the hazard is too low or too high; what if they could adjust the hazard directly, before it flows through the vulnerability and financial modules?

Using the RMS MetaModeler, (re)insurers can define and control how they manage their view of modeled and non-modeled risk. They can incorporate multiple views of the risk, whether from RMS models, non-RMS models, or non-modeled sources—all in the RMS(one) environment—into a complete view at all relevant levels of the organization.

The MetaModeler is powered by the RMS Cloud and all capabilities on it can be run on-demand. Users can perform sensitivity tests and model runs on customized RMS models in a fraction of the time required in RiskLink, for even the largest portfolios. The MetaModeler can also quickly run non-RMS models and can bring all required catastrophe and non-catastrophe views together on a consistent basis.

All losses, whether from RMS or other sources, can be analyzed using RMS Analytics, bringing new insights through additional loss and exposure metrics, drill-down capabilities, and visualization. On RMS(one), modeled losses and analytical output can be quickly updated to reflect changes in portfolios as they evolve.

The RMS Reference View™: Our Best View of Risk

RMS will always provide our best modeled view of the risk for all peril regions: this is the RMS Reference View. The RMS Reference View is based on our latest scientific understanding, engineering knowledge, decades of catastrophe modeling experience, and expert judgment. Now, users will have the ability to view and adjust model settings corresponding to the Reference View for each peril region. RMS clients can use the MetaModeler to validate RMS models' views of risk

and make defensible, transparent changes. However, we expect the majority of RMS clients to adopt the RMS Reference View as their own view of risk.

When the Reference View is updated to reflect new research and ongoing learning, the new view will be translated seamlessly to the RMS(one) environment with full audit trails, bringing greater insight to model change.

Sensitivity Views: Understand Uncertainty and Volatility

Catastrophe risk is characterized by deep uncertainty, and a responsible strategy demands a continuous dialogue between what we know and what we do not. A resilient risk management strategy embraces, rather than ignores, the inherent uncertainty in catastrophe risk, and uses that insight to make more informed decisions, which are tailored to each company's specific portfolio and strategy.

The exploration of uncertainty starts with performing multiple sensitivity tests, which helps build intuition around potential volatility. This requires the technology for fast run times, the ability to fine-tune model components, and a baseline model you can trust—capabilities enabled on the RMS MetaModeler. RMS(one) users can build their own sensitivity tests to understand the sensitivity of their portfolios to certain model components, as well as run sensitivity tests packaged by RMS, to improve their understanding of the uncertainty associated with RMS models.

Customized Views: Integrate Your Own Experience

By providing access to the major building blocks of catastrophe models, clients will gain greater insight into model assumptions; this in turn helps users to better understand the sensitivity of portfolios to key model components. RMS(one) users can customize RMS models either by adjusting model data and components, or replacing them with external data and components to incorporate a company's own research, experience, claims, and underwriting practices directly into their view of risk.

The MetaModeler offers a range of customization options, including:
- Event rates and hazard module values, e.g., ground motion or wind speeds
- Vulnerability curve relationships and mean damage ratios
- Ground-up and gross losses

Users can customize event, geographic, or exposure characteristics prior to financial model calculations, and can define and import hazard footprints for customized event response or scenario analysis.

Alternative Views: Non-RMS Models, Model Versions, Blended Results

RMS(one) efficiently enables a multi-model view of risk that can include results from multiple versions of RMS and non-RMS models; these views can be blended.

Non-RMS Models

Non-RMS models, either developed by other modeling companies or built in-house, can operate in the RMS(one) environment. This allows (re)insurers to more easily create a holistic view of risk that is derived from various sources and combined in a consistent, efficient way, while reducing the need to manage and maintain multiple model environments.

Model Change Management

Managing model change has many technical and analytic components, such as hosting a new version for testing in parallel to the production version; increasing data storage and computing requirements to run and analyze results; and employing additional analytical tools to investigate the change impact on specific regions or lines of business.

The RMS(one) environment supports the use of more than one RMS or other model version, improving change management when models are updated. The ability to support multiple model versions reduces the challenge of maintaining multiple model version environments, while offering a highly sophisticated analytical environment to enable "deep dives" into data.

Coupling this with capabilities to perform more in-depth sensitivity analytics, including those recommended and deployed by RMS prior to model updates, allows RMS(one) users to understand the impact of model change on their book of business early on, using straightforward methods.

Model Blending

In the RMS MetaModeler, users can blend output from multiple models (RMS and non-RMS) using a variety of common blending approaches. Users have the option to combine losses from non-RMS models, calculated using the RMS(one) financial model, and can incorporate statistical frequency and severity distributions, including related losses. They can also consider output from simple non-probabilistic models, such as estimations of attritional losses for pricing.

Non-Modeled Risk: Capturing All Sources

The RMS MetaModeler is flexible enough to capture all sources of risk, enabling insurers and reinsurers to build a more complete view of risk and more realistically estimate loss potential. RMS(one) users can incorporate non-modeled exposures and contract terms and conditions (including limits, deductibles, and causes of loss), and execute sophisticated deterministic models of their own design.

Users can import shape files sourced from third parties, create user-defined events, customize historical events, select and run event IDs from the RMS stochastic event library, or access RMS' extensive accumulation catalog of events in non-modeled peril regions.

Deterministic modeling capabilities in the MetaModeler enable risk modeling for peril regions not currently covered by probabilistic models. Using the catalog of events, users can build scenarios that reflect detailed damage factors (e.g., based on exposure, event, cause of loss, or coverage attributes), multiple underwriting views, and knowledge of prior losses. Damage factor matrices provide multiple perspectives of the losses and reflect the users' view on the level of uncertainty.

Deterministic modeling is supported by specific reporting capabilities that allow users to monitor scenarios against internal guidelines, and will alert them to the aggregating impact of newly added contracts. Additionally, users can apply the RMS(one) financial model to their global exposure while accessing the new data model, effecting the move from basic accumulation-based analysis to a fully flexible, comprehensive deterministic modeling approach.

Once the non-modeled element of a risk is understood, the model customization features allow users to adjust the probabilistic model output at the relevant point of calculation (e.g., scaling the EP curve by 5%, or only doing so over specific return periods) reflecting the potential for loss from the non-modeled portion of that risk.

Security and Audit Controls

RMS(one) will provide a range of related features to help develop, deploy, and run RMS and non-RMS models. This includes the ability to ensure that only the users with the correct permissions can customize models. It ensures that results generated on the basis of a customized model can be replicated by external parties while protecting, as desired, the detailed nature of customizations.

The RMS MetaModeler records and tracks all model changes and settings applied in an analysis for both internal and external use, to ensure that all parties accessing model output are in agreement as to the exposure basis, assumptions, and settings for model runs, as well as to meet regulatory requirements.

Model data and component adjustments are automatically documented in a consistent, efficient, transparent, and repeatable manner, giving the user the ability to reproduce results with full knowledge of every instance of customization. In addition, RMS will publish guidelines with all customization settings to ensure the science behind the setting is never misrepresented.

The MetaModeler: Your View of Risk

The RMS MetaModeler enables RMS(one) users to build their own view of risk. For the first time, RMS clients can utilize one platform to validate the applicability of models to the business they write, and take control of the models to make more informed decisions tailored to their particular portfolio and business strategy.

Users can test and modify RMS model assumptions, data, and components, import non-RMS results, run non-RMS models and blend output from RMS and/or non-RMS models. All model output can be flexibly combined into a comprehensive view of catastrophe and non-catastrophe risk.

A resilient risk management strategy is one that allows clients to understand their implied bets, adapt to ongoing learning, and create their own view of risk. By opening the models, through the MetaModeler, RMS(one) users gain the control and flexibility to implement their resilient risk management strategy in a way that has previously not been possible, and to develop a view of risk which they can put forward with confidence to internal and external stakeholders.