Solvency II – Use of External Models and RMS Response

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Solvency II: What to Worry About?

- 2011 is a key year
- Failure of internal models will force companies to use standard formula
- Appropriate data quality, detailed knowledge, comprehensive documentation and robust processes required to comply
- Using standard formula could significantly increase capital requirements
- Modeling companies as the builders of the models are best placed to offer users the needed insight into our models and their usage
**Roadblocks for Getting the Catastrophe Element of the Internal Model Approved**

- Cat modelling process must be consistent with the standards and requirements for internal models.
- "In-house expertise" to be developed and retained by insurance companies.
- Validation process needs to test the sensitivity of results to changes in key assumptions.
- QIS4 Report: "...only 33% of respondents stated that their data is sufficiently accurate, complete and appropriate for non-life catastrophe risk."
- The model shall cover all of the material risks that the company is exposed to.
- Need to document and explain the role of external models and the extent to which they are used within their internal model processes.
- Need to demonstrate "detailed knowledge" of methodologies capabilities and limitations of external models.

**Sources:** Level 2 Implementing Measures and QIS 4

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**How are RMS helping?**

1. Additional models and greater alignment with Solvency 2
2. Consulting reviews
3. Education and interpretation
4. Data quality tools and services
5. Life and health modeling
1. Additional Models

Europe Earthquake 2011
- All countries on unified event set with existing countries
- Upgrades to Turkey and Greece models
- Add 4 new countries: Romania, Hungary, Bulgaria and Slovenia

Europe Windstorm Extension 2011
- Latest modeling techniques and integration of more claims and windspeed data
- Adding 3 new countries for greater coverage of risk

Pan-Europe flood 2013
- Cover all 12 countries
- Cross basin & country correlations from one event set
- Precipitation-based model, so includes all off floodplain as well as river-driven flood risk

RMS’ Models available to support Solvency II
RMS will have a near complete suite of models to support the Solvency II process in FY11

<table>
<thead>
<tr>
<th>Cat Scenarios included in QIS5</th>
<th>RMS Model Available in 2010</th>
<th>RMS Model Available in 2011</th>
<th>RMS Model Available in 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>MS</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>EQ</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>NL</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

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RMS is developing analytical capabilities to support Solvency II requirements, including:

- Increased transparency into model assumptions
- Ongoing efforts to reduce uncertainty where possible
- Additional flexibility in representing risk

We are also working on a major upgrade of the standard Risklink software that will facilitate Solvency II-related capabilities.

Key to developing these capabilities is partnership with clients.
### 3. Education And Interpretation

<table>
<thead>
<tr>
<th>Type of Client</th>
<th>Problem</th>
<th>Findings</th>
<th>Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full service commercial insurer</td>
<td>Needed to redesign process to satisfy regulator and board concerns and meet Solvency II requirements</td>
<td>No consistent methodologies for incorporating data quality, non-modelled loss, model uncertainty or marginal risk into decision making</td>
<td>Redesign multiple aspects of overall process including information and reporting for both underwriting and portfolio management</td>
</tr>
<tr>
<td>Multinational reinsurer</td>
<td>Attempted to update its catastrophe management process but was unsure of its suitability for renewals</td>
<td>IT resources are inadequate; planned development would not meet required deadlines</td>
<td>Refocus on tactical issues; provide alternative tools; create reports with company-wide adoption</td>
</tr>
<tr>
<td>Direct insurance writer with a binders book</td>
<td>Recognized a general need for improvement; regulatory bodies indicate their overall process may be poor</td>
<td>Analytics and resources did not support advanced decision-making</td>
<td>Outsource daily model runs; halve reporting times; design tools for internal capacity trading</td>
</tr>
<tr>
<td>Growing direct writer with large EQ and HU concentrations</td>
<td>Needed to improve data, were being penalised by reinsurers due to poor data quality</td>
<td>Data translation process was inconsistent; poor communication between modellers and data providers</td>
<td>Resolve data problems with standardized process and audit; RMS review used with rating agencies</td>
</tr>
<tr>
<td>Experienced retrocessionaire</td>
<td>Required verification of processes for investors</td>
<td>Internal pricing calculations were error-prone</td>
<td>Correct pricing templates; develop robust simulation methodology; create report for investors</td>
</tr>
</tbody>
</table>

**Executives**
- Must demonstrate a "sufficient" understanding of third party models and their limitations
- Executive level training (½ day)

**Actuarial**
- May require special instruction on technical aspects of the cat models
- Technical training for Solvency II (2 days)

**Cat Modeling**
- May require certification
- CCRA certification (1 week)
4. Data Quality

<table>
<thead>
<tr>
<th>#</th>
<th>Occupancy Description</th>
<th>Construction Description</th>
<th>Num Stories</th>
<th>Year Built</th>
<th>AAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Professional, Technical &amp; Business Services</td>
<td>Masonry</td>
<td>105</td>
<td>1931</td>
<td>465%</td>
</tr>
<tr>
<td>2</td>
<td>General Commercial</td>
<td>Masonry</td>
<td>1</td>
<td>Unknown</td>
<td>225%</td>
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<tr>
<td>3</td>
<td>Permanent Dwelling (single family housing)</td>
<td>Reinforced Concrete</td>
<td>Unknown</td>
<td>1931</td>
<td>35%</td>
</tr>
<tr>
<td>4</td>
<td>Professional, Technical &amp; Business Services</td>
<td>Reinforced Concrete</td>
<td>102</td>
<td>Unknown</td>
<td>-23%</td>
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<tr>
<td>5</td>
<td>General Commercial</td>
<td>Unknown</td>
<td>1</td>
<td>1996</td>
<td>102%</td>
</tr>
<tr>
<td>6</td>
<td>Telephone &amp; Telegraph</td>
<td>Unknown</td>
<td>Unknown</td>
<td>1931</td>
<td>132%</td>
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<tr>
<td>7</td>
<td>Entertainment &amp; Recreation</td>
<td>Unknown</td>
<td>1</td>
<td>Unknown</td>
<td>124%</td>
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<tr>
<td>8</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>76%</td>
</tr>
<tr>
<td>9</td>
<td>General Commercial</td>
<td>Unknown</td>
<td>102</td>
<td>1931</td>
<td>8%</td>
</tr>
</tbody>
</table>

Actually:
- General Commercial
- Steel Frame
- 102 stories
- Built 1931
## Data Quality Solutions

<table>
<thead>
<tr>
<th>Stages that problems occur</th>
<th>Solution</th>
<th>Benefits</th>
</tr>
</thead>
</table>
| Data Formatting            | Dedicated resources or outsource cleansing | Place process in the hands of experts  
Free resource to focus on decision support  
Establish a consistent approach |
| Data Evaluation and Enhancement | Applied data quality analytics | Better quantify impact of poor data quality  
Prioritize locations to improve with effort / $  
Evolve underwriting guidelines |
| Running Models             | Outsourced analytics or process automation | Free resource to focus on interpretation of results  
Reduce risk of human error  
Improve auditability of process |

### 5. Life and Health

- **Excess Mortality**
  - Solvency II excess mortality test to compare standard formulae and RMS
  - Contribution of sources of excess mortality (influenza, other infectious diseases)

- **Longevity**
  - Longevity Scenarios
  - Measures differences for reserves and annuity liability
  - Explore Solvency II diversification credits
Summary

- 2011 Will be a Key Year
- Cat models are complicated, and detailed knowledge will be required by users
- RMS offers a suite of solutions to help with the catastrophe model component of your internal model submissions
  1. Additional models and greater alignment with Solvency 2
  2. Consulting reviews
  3. Education/ Interpretation
  4. Exposure Data – “Complete, Accurate, Appropriate”
  5. Life and Health