The Underwriter must be Empowered

- The foundational element of our industry is underwriting
- A model will never replace the underwriter
- Data is valuable - and more available than ever
  - Use it to differentiate
- Active catastrophe management is possible
  - Select risks, transact with knowledge, build a winning portfolio
- It’s the Underwriter’s job and reputation at risk

- Your Catastrophe Management department is a resource and is your friend!

“IF YOU ARE PREPARED, YOU WILL BE CONFIDENT, AND WILL DO THE JOB.”

TOM LANDRY

Lifehack Quotes
Catastrophe Models

- Are nothing more than tools in the Risk Management and Risk Selection process
- Help us understand the range of possibilities over the long term
- Create a common currency
  - To compare and contrast risks
  - For rating agency evaluation
  - To communicate and trade with partners
- Provide guidance and benchmarking
- Evaluate many variables at one time
- Increase consistency
- Compare and contrast risks
- Create a baseline
- Optimize capital outlay
- Produce Numbers. With insurance, numbers are not as important as contract wording

Catastrophe Models are powerful tools. Like most powerful tools, it must be implemented accurately and responsibly; in a manner consistent with its construction.
Maintaining recognition of what models can and cannot do is everyone’s job.

Recognize there is more uncertainty about cargo, boats, and cranes than single family homes.

Are more accurate at the portfolio than at the location level.

Should be balanced with limits based metrics.

Limit surprises and increase preparedness.

- In nearly all circumstances relating to insurance, surprises are bad.

Don’t be an outlier in a negative way.

Catastrophe Modeling is not a synonym for Catastrophe Management.
Driving the Desire for Data

- Focus on data – good data is of immense value, well beyond catastrophe modeling
- Concern for data overload and inability to make decision (analysis paralysis)
- Convey the knowledge you have – store it and reuse it
  - Understand peripheral concerns and mitigating factors
  - Vulnerability of contents
    - What and Where?
    - Tires, Garments, Electronics, Food
  - What protections are in place?

He uses statistics as a drunken man uses lamp posts – for support rather than for illumination.
Andrew Lang, Scottish Writer
The only certainty regarding the next event is it will be different than anything we have seen before.

- Leverage technology
- Timely delivery of information
- More explicit “view of risk” integration
- Look beyond fixed locations
- Live tracking
- Active portfolio management
Cat Modelling in Reinsurance
Dianna Nelson, PhD
AIMU conference 14 May 2015
NatCat modelling considerations

Hazard
- Where?
- How often?
- How strong?

Asset distribution
- What are the assets? Where are they located?

Vulnerability
- How does a structure respond to a given intensity?

Insurance structure
- What is covered?

Wind speed
- loss (%)

Return Period
- loss ($)

Asset distribution

Vulnerability

Insurance structure
Example wind speed footprint for tropical cyclones.

Historical record is not enough; must also consider events that have not happened but have the physical possibility to occur at some point in the future.
Exposure

From Exposure Data
- Total value (or replacement costs) of assets that is at risk
- Address or location information
- Peril to be modeled

Geocoding
Model expects exposure at latitude/longitude coordinates. Geocoding is the process of finding those coordinates if not given by the exposure data (e.g. street address or CRESTA zone).
Vulnerability

What are the parameters of vulnerability?

**Damage is a function of:**
- hazard intensity
- coverage type (property damage vs business interruption)
- risk category (Occupancy)
- quality/age
- (protection)/preparedness
- construction type
- loss inflation
General Nat Cat modelling challenges

- models are not perfect, and should be used as a guidance
- structure of hazards can be complex (e.g. wind vortices impacting a skyscraper)
- nature of Nat Cat events is complex: low frequency, high loss events still leave a lot of uncertainty despite scientific methodology used to build Nat Cat models
- impacts of climate variability
- future impacts of climate change
- population growth
- getting accurate, detailed information about risks in a portfolio can be very difficult
Ocean Marine – challenges

- some Nat Cat models can be used as guidance for static risks (warehouses, ports, distribution centers, etc.), though same uncertainties mentioned earlier still apply

- added challenges for modelling content values in distribution centers (e.g. cyclical nature of content changes throughout the year)

- Nat Cat models can't capture expected losses for non-static risks (e.g. ships)

- Off shore tropical cyclone models have yet to be tested, especially in the Gulf of Mexico due to a near decade of quiet activity
Looking forward

• Emerging risk markets? (offshore energy for China and West Africa)
• Can we capture currently non-modelled hazards? (e.g. subsea exposures for off shore risks)
• Impacts of climate change? (rising sea levels, impacts on precipitation)
Cat modelling and Reinsurance

- given the complexity of natural catastrophes, models can not fully capture the potential impacts of these events
- further modelling challenges are added with considerations including structure type, year built, location, etc.
- model results are only as good as the input given
- for costing, a number of cat models (including some vendor and SR internal models) are considered
- cat models are also used to determine where reinsurance appetite is for certain perils
- from a reinsurance perspective, cat models are meant as tools to be used for costing guidance, the most important tool at our disposal is good underwriting judgement and experience
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Role of the Reinsurance Broker - Then
Historically a Linear Process…

1. Understanding Client Needs & Risk Philosophy
2. Identify and Quantify Risk
3. Data Gathering and Preparation
4. Risk Transfer Recommendations
5. Marketing
6. Firm Order Terms
Role of the Intermediary – Now
... Interactive, Dynamic and Evolving Process

Reinsurance Intermediary

- Business Intelligence
- Strategic Advisory
- M&A / Securitization
- Contract Review
- Marketing / Placement
- Actuarial Services / Risk Transfer
- Deep Portfolio Insight
  - Catastrophe Modeling
  - New levels of risk quantification
Evolution of Reinsurance Intermediary’s Role
How Do Brokers Assist in the Modeling Process?

- **Data quality** directly impacts an organization’s performance
  - Credible information = better decisions = better financial performance
  - Above average data quality can lead to favorable reinsurance pricing

- **Actionable insight** provides a clear understanding of portfolio characteristics
  - Supports strategic adjustments designed to maximize goals
  - Uncovers hidden opportunities that can be leveraged

- **Risk advisory services** creates value in contrast to pure transactional
  - Value-added products and services are designed to help improve portfolio financial metrics
GUY CARPENTER

Reinsurance Intermediaries – Catastrophe Models
Data Quality and Actionable Insight – Future Needs and Driving Change

• Gathering, digesting and transforming “Big” data into actionable insight
  – Profile Company exposures and loss contribution by geography, line of business and loss contribution
  – Benchmark Company key metrics to gauge data quality
  – Leveraging deep insight and metrics to Company advantage
Reinsurance Intermediaries – Catastrophe Models
Strategic Advisory Services – Offering Expert Advice

- **Portfolio management**
  - Exposure accumulations and key trends

- **Model insight**
  - Dissecting the “black boxes”
  - Differences, limitations, adjustments

- **Portfolio insight**
  - Loss drivers
  - Benchmark company exposures

- **Portfolio performance**
  - Financial metrics (holistic view)
Evolution of Reinsurance Intermediary’s Role
Improving Portfolio Performance

• Value-added services that go beyond basic reinsurance placement
  – Managing exposure concentrations (align portfolio changes with risk tolerance)
  – Understanding marginal impact of exposure change on loss curve (strategic implementation)
  – Expanding catastrophe loss view to a full profit and loss perspective (holistic view)
  – Uncovering predictive interactions of variables in data to improve portfolio performance
Evolution of Marine (Re)Insurance Modeling
(Re)Insurance Organization and Models: Symbiotic Relationship

• How have catastrophe models impacted our industry?
  – Capital investment in systems and staff
  – Improved data capture and reporting
  – Managing exposures and loss contributions

• How has our industry impacted catastrophe models?
  – Challenge results and require ongoing improvements
  – Increasing user needs create new model capabilities
  – Innovative user applications drive new features
  – Stepping-stone for broader analytics
Evolution of Catastrophe Models
What’s Next on the Horizon?

• Traditionally marine model enhancements are driven by events
  – 2004 / 2005 Storms (Frances, Ivan, Wilma): Yacht

• Marine insurance industry needs to “drive” catastrophe models and analytics forward

<table>
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<tr>
<th>Exposures</th>
<th>Modeled Catastrophe</th>
<th>Non-Modeled Catastrophe</th>
<th>Non-Catastrophe</th>
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Generally 40 – 60%       60 - 40 %
Evolution of Catastrophe Models
Moving Marine Capabilities Forward – Potential Factors Driving Change

- Significant major event revealing model deficiencies
- Emerging needs identify new applications
- Third-party (alternative) capital
  - Growing presence in traditional property marketplace but generally “untapped” for marine
  - Since 2008 releasable alternative capital increased from $18b to $60b and utilization in global property cat increased from 8% to 18%
  - Marine catastrophe modeling capabilities need to improve to access

Source: Guy Carpenter, Oliver Wyman analysis
Catastrophe Models - Closing

• The marine reinsurance process is an interactive, evolving process that in many ways “hinges” on catastrophe models and analytics

• Reinsurance intermediaries provide a deep understanding of catastrophe models by applying diversified disciplines such as risk, science, mathematical and actuarial

• Progressing marine catastrophe modeling capabilities forward will depend on a number of factors but lies with the users

• Reinsurance intermediaries have and will continue to play a significant role in the development and application of catastrophe models

• On a more personal note
  – Additional skill sets and self-development will be required to successfully operate in this increasingly complex risk transfer environment
  – Individuals that think they alone can solve the new complexities facing “our world” will remain in the linear fantasyland
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