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ERM – Making it come alive through the use of Operational Risk Reporting and Modelling

Alex Hindson
CRO
Amlin AG

5 December 2014

Agenda

- Amlin's Risk Management Framework and operational risk
- Modelling methodology
- Scaling methodology and data
- Using loss event information

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Risk Management Framework & where operational risk fits

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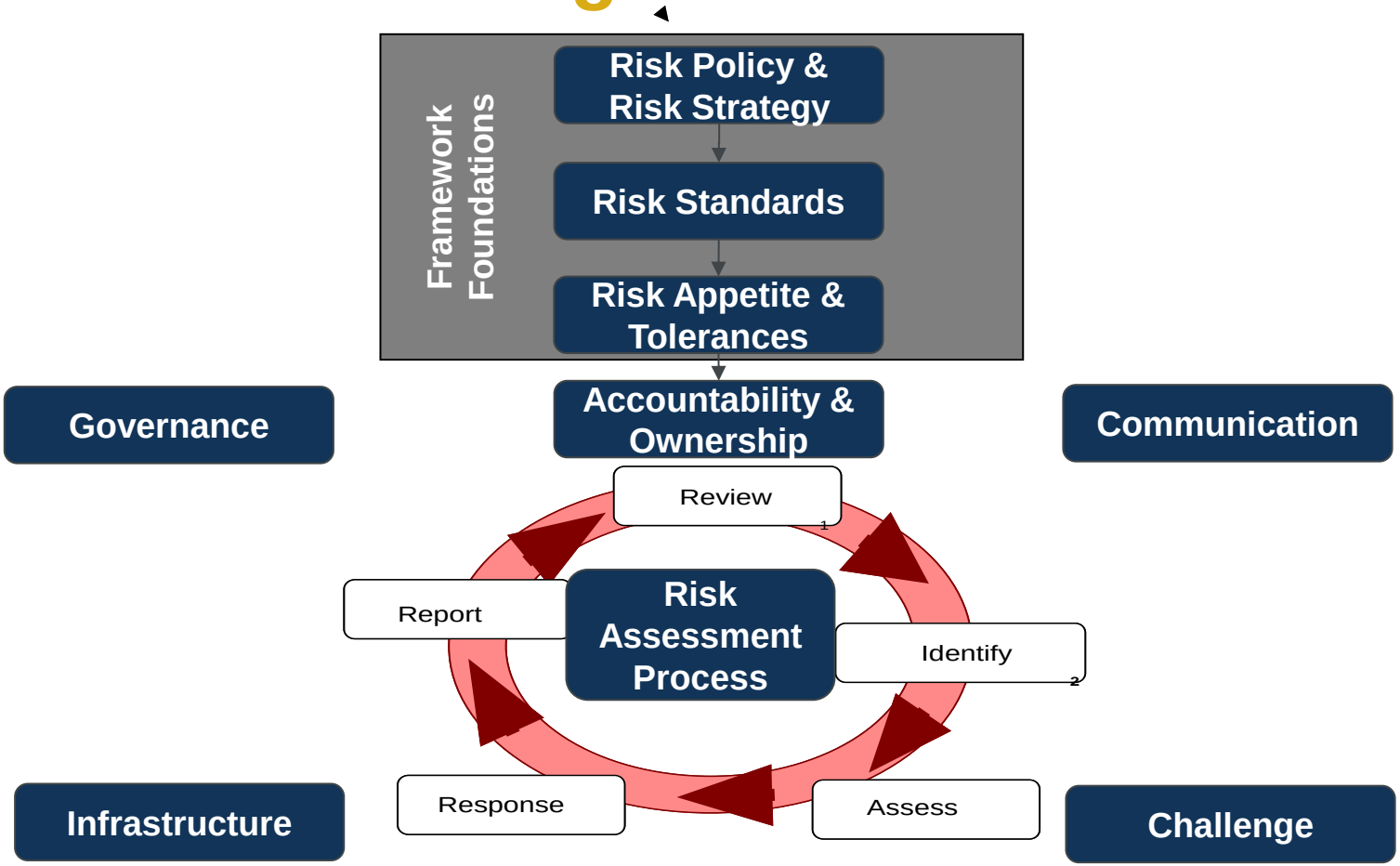
Amlin's Risk Management Framework



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Risk appetite in context

- Risk Preferences and Drivers
  - A philosophical position is to achieve a balance of risk and maximise the benefit of Amlin's strengths and core competencies.
  - Insurance is attractive provided good returns can be achieved in relation to the risk
  - Liquidity risk is unattractive. Failure to pay valid claims is a major reputational threat.
  - Market risk is to enhance profitability within the limitations of matching assets to liability, maintaining liquidity and preserving the balance sheet.
  - **Operational and Credit risks are undesired consequences of operating as an insurance company. The cost/benefit of controls need to be considered.**
- Risk Appetites
  - A high-level statement of level of risk that Amlin is able and willing to accept.
  - An strategic articulation of what risks Amlin is prepared to take to deliver its appetite and which risks or level of risk it is unwilling to take in order to protect its balance sheet.
- Risk Tolerances
  - Specific levels of risk that Amlin is prepared to bear.
  - Reported to Boards and Risk Committees within ORSA.
  - Quantified and performance is tracked to ensure business operates within these boundaries.
- Risk Limits
  - Transactional level business controls.

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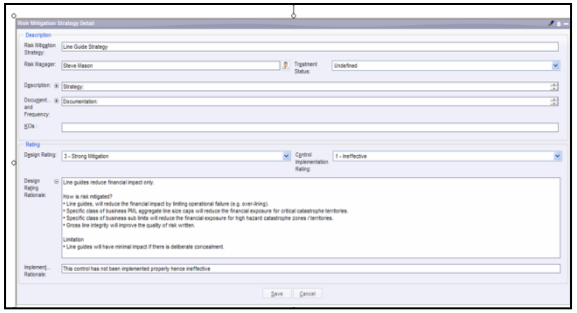
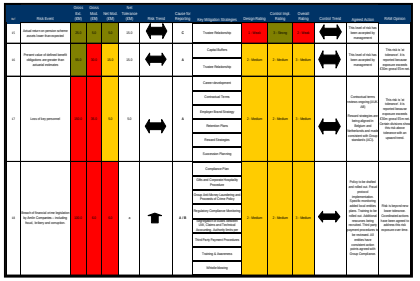
How does risk assessment fit into the 'bigger picture' of capital management and business planning?

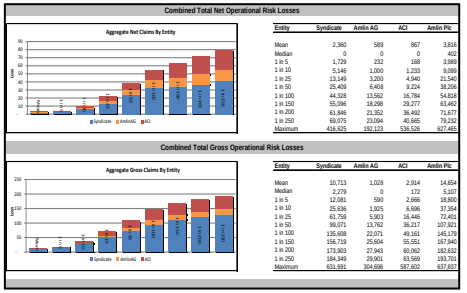
Risk Assessments



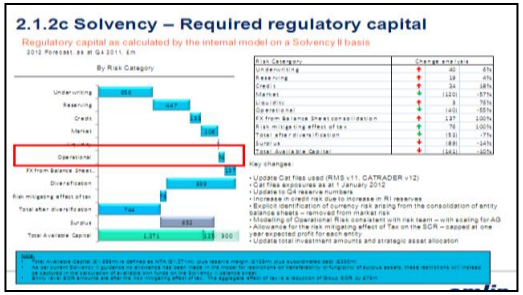
ORSA Reporting



Operational risk modelling



Internal Model Capital



Business Planning

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Modelling methodology

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Business Case and philosophical position

- There is no ‘upside’ for insurers in having to hold capital against operational risks, hence there is value in controlling any increase in regulatory capital charges for operational risk capital.

- Integrating operational risk fully into Internal Model gains diversification benefits.

- Modelling can help justify return on investment for risk mitigation actions.

- Enhances perceptions of an organisation and its risk management by credit rating agencies. Influences ERM and credit ratings.

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History of model development

- Amlin has been developing an Internal Model since 2001 (pre-ICA)
- Operational risk modelling has been significantly enhanced since 2010
- Drivers were:
  - Making a stronger link between capital management and risk management
  - Incentivising risk improvements and ‘loading’ for poor control environment
  - Creation of a robust SCR capital calculation for Operational Risk
  - Substantiating modelled diversification benefit
  - Solvency II compliance

Year	2010	2011	2012	2013	2014
Key development	Basic Excel-based model Establish conceptual logic	Management engagement and challenge of outcomes	Moving from ‘prototype’ to ‘production’ system	Release risk function from ownership, to allow validation	Increase visibility and ownership of inputs / expert judgement
Enablers	Palisade software Joining ORIC	ORSA review and challenge	Moving stochastic simulation into Igloo Validation	Igloo enterprise upgrade ORIC scaling project Validation	Igloo web interfaces Alternative curve selection to LogNormal

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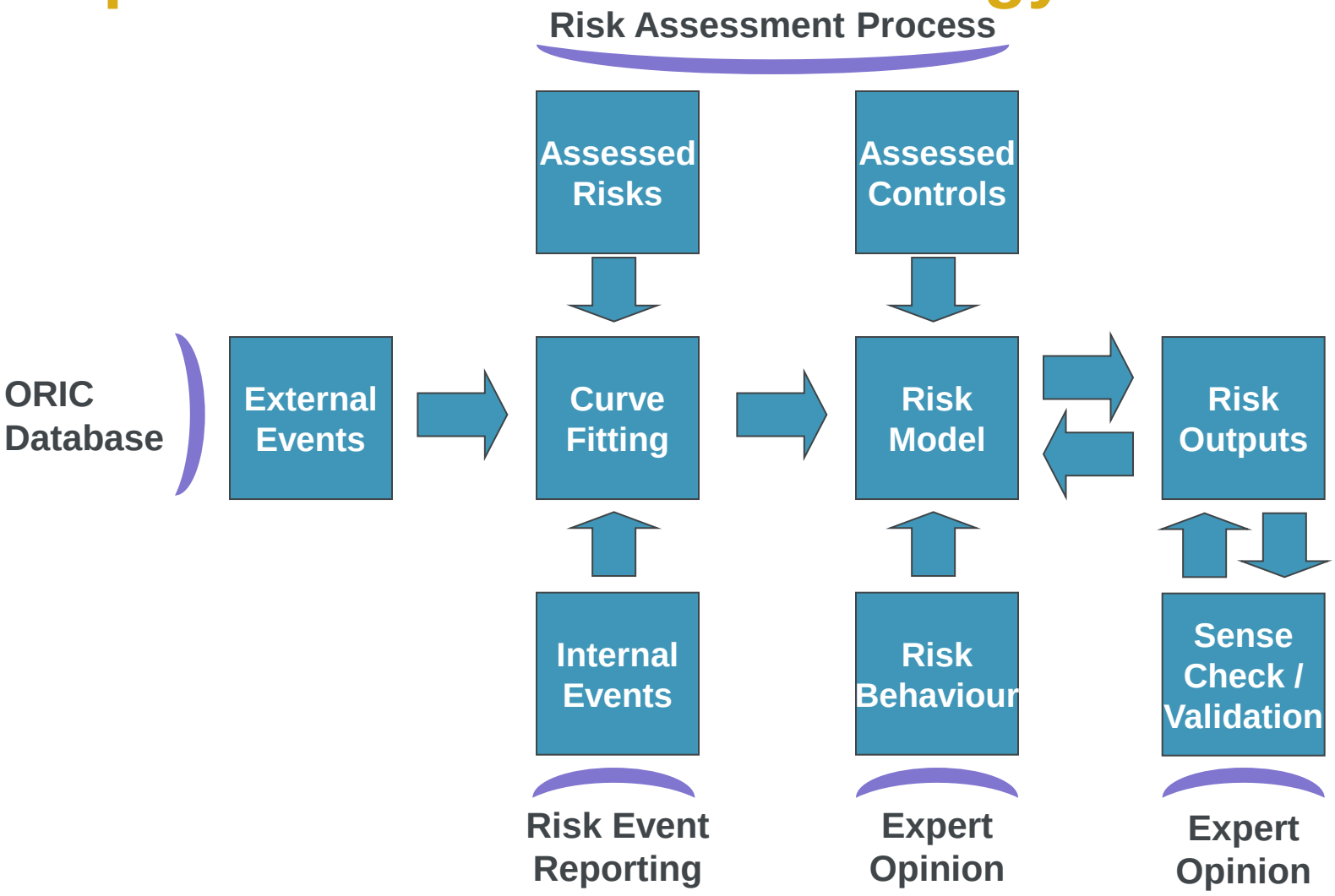
Operational risk methodology overview



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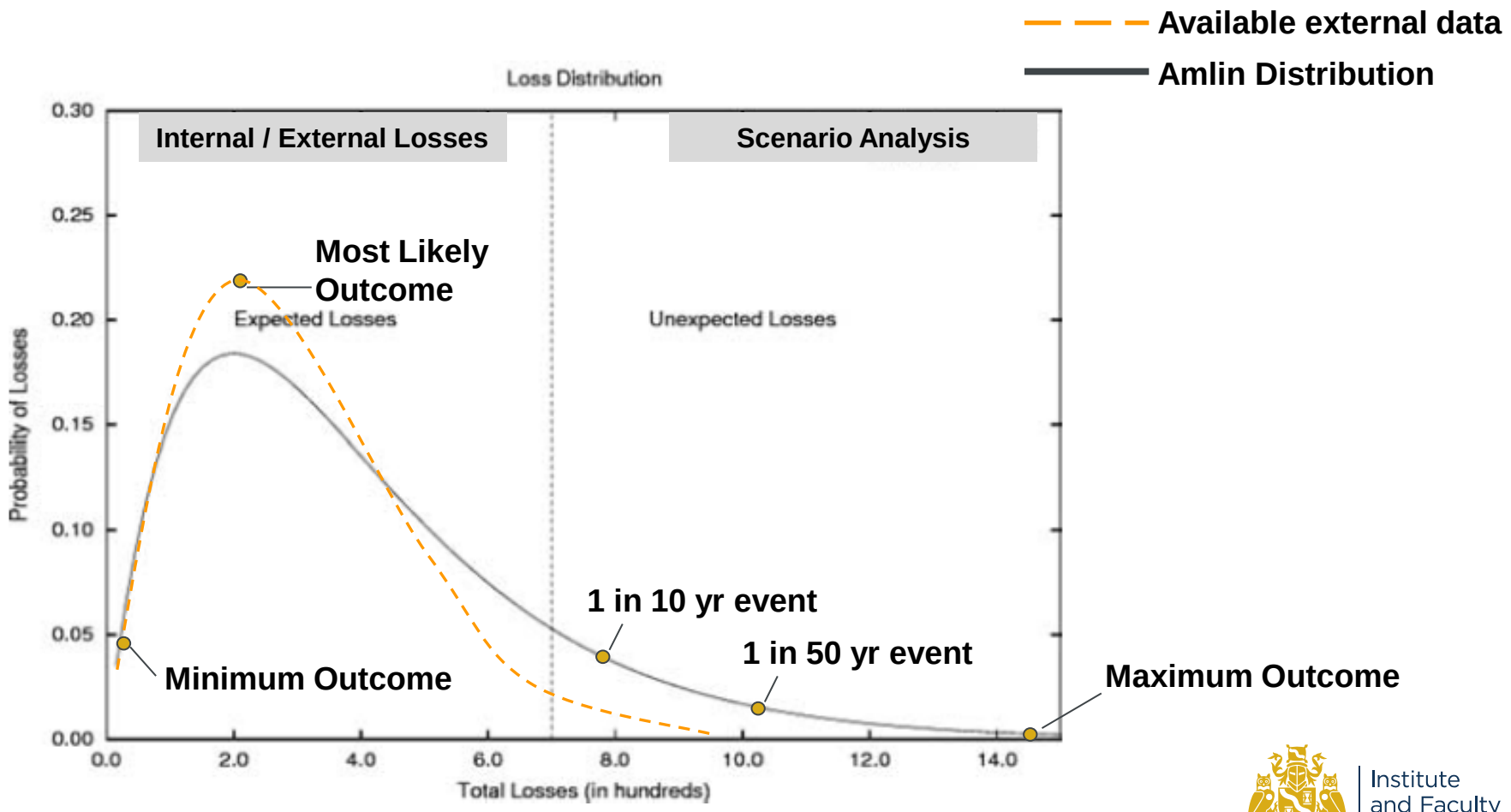
Data sources and curve fitting



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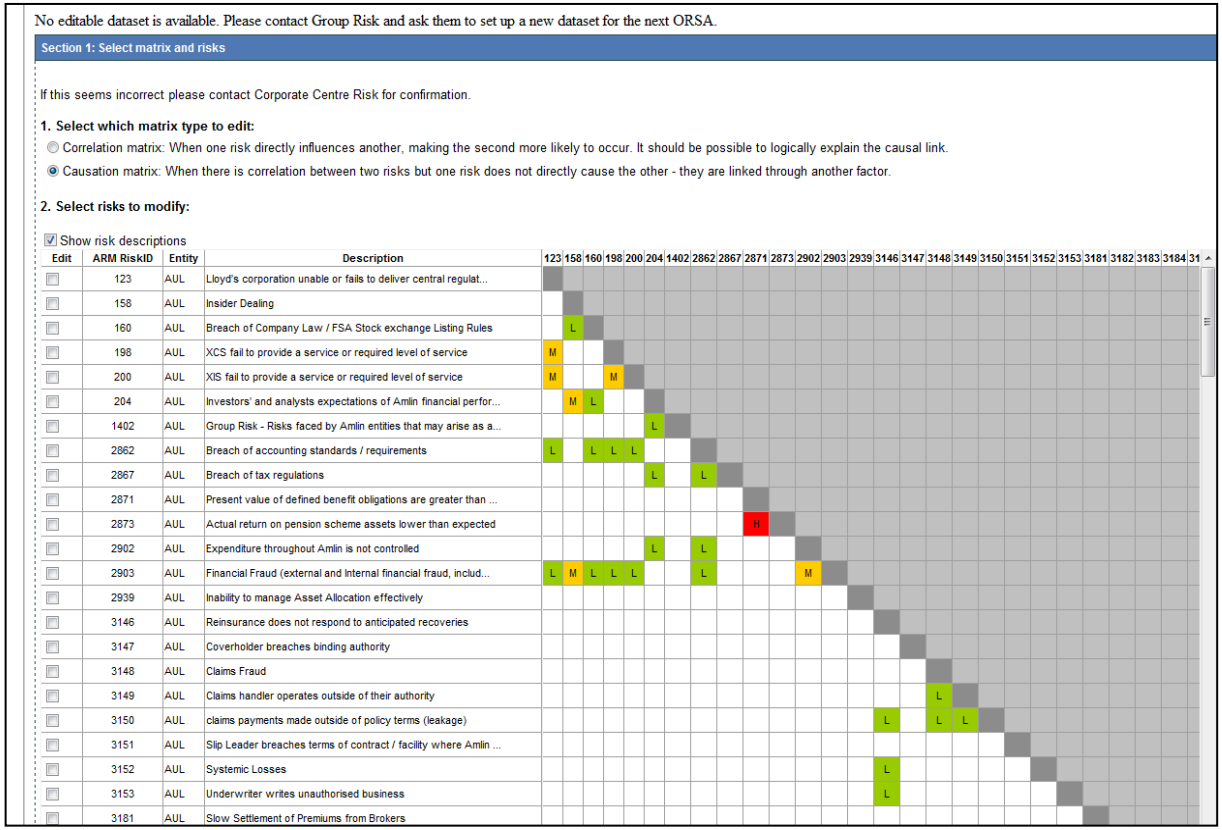
Embedding the capture of expert judgements

- Making expert judgement more visible and challengeable
  - Example – correlation grids and rationale for linkages



No editable dataset is available. Please contact Group Risk and ask them to set up a new dataset for the next ORSA.

Section 1: Select matrix and risks

If this seems incorrect please contact Corporate Centre Risk for confirmation.

1. Select which matrix type to edit:

- ○ Correlation matrix: When one risk directly influences another, making the second more likely to occur. It should be possible to logically explain the causal link.
- ◉ Causation matrix: When there is correlation between two risks but one risk does not directly cause the other - they are linked through another factor.

2. Select risks to modify:

☑ Show risk descriptions

Edit	ARM RiskID	Entity	Description	123	158	160	198	200	204	1402	2862	2867	2871	2873	2902	2903	2939	3146	3147	3148	3149	3150	3151	3152	3153	3181	3182	3183	3184	31
☐	123	AUL	Lloyd's corporation unable or fails to deliver central regulat...																										
☐	158	AUL	Insider Dealing																										
☐	160	AUL	Breach of Company Law / FSA Stock exchange Listing Rules		L																								
☐	198	AUL	XCS fail to provide a service or required level of service	M																									
☐	200	AUL	XIS fail to provide a service or required level of service	M			M																						
☐	204	AUL	Investors' and analysts expectations of Amlin financial perfor...		M	L																							
☐	1402	AUL	Group Risk - Risks faced by Amlin entities that may arise as a...						L																				
☐	2862	AUL	Breach of accounting standards / requirements	L		L	L	L																					
☐	2867	AUL	Breach of tax regulations						L		L																		
☐	2871	AUL	Present value of defined benefit obligations are greater than ...										H																
☐	2873	AUL	Actual return on pension scheme assets lower than expected																										
☐	2902	AUL	Expenditure throughout Amlin is not controlled						L		L																		
☐	2903	AUL	Financial Fraud (external and Internal financial fraud, includ...	L	M	L	L	L			L				M														
☐	2939	AUL	Inability to manage Asset Allocation effectively																										
☐	3146	AUL	Reinsurance does not respond to anticipated recoveries																										
☐	3147	AUL	Coverholder breaches binding authority																										
☐	3148	AUL	Claims Fraud																										
☐	3149	AUL	Claims handler operates outside of their authority																	L									
☐	3150	AUL	claims payments made outside of policy terms (leakage)															L		L	L								
☐	3151	AUL	Slip Leader breaches terms of contract / facility where Amlin ...																										
☐	3152	AUL	Systemic Losses															L											
☐	3153	AUL	Underwriter writes unauthorised business															L											
☐	3181	AUL	Slow Settlement of Premiums from Brokers																										

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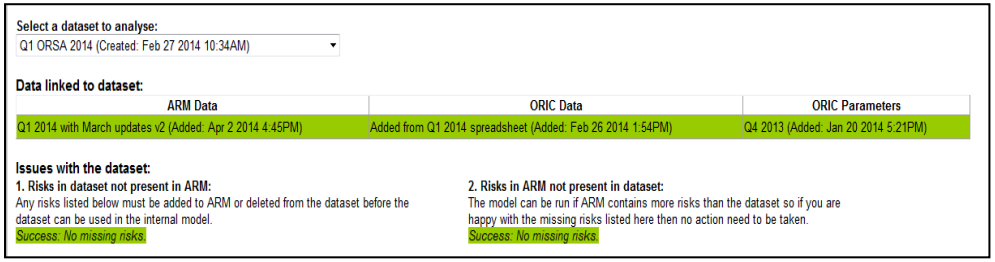
Embedding the capture of expert judgements

- Making expert judgement more visible and challengeable
  - Risks added or removed from model
  - Confirming risk register and model alignment



Select a dataset to analyse:

Q1 ORSA 2014 (Created: Feb 27 2014 10:34AM)

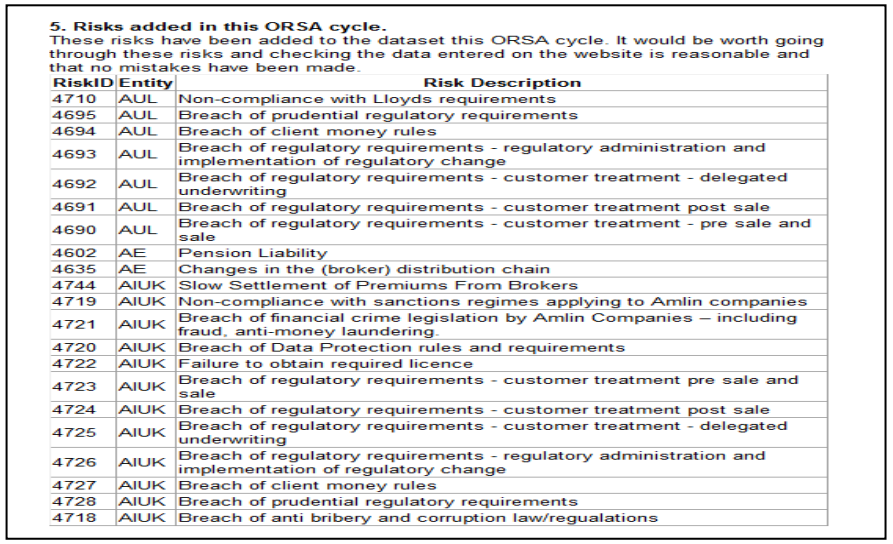
Data linked to dataset:

ARM Data	ORIC Data	ORIC Parameters
Q1 2014 with March updates v2 (Added: Apr 2 2014 4:45PM)	Added from Q1 2014 spreadsheet (Added: Feb 26 2014 1:54PM)	Q4 2013 (Added: Jan 20 2014 5:21PM)

Issues with the dataset:

1. Risks in dataset not present in ARM:
Any risks listed below must be added to ARM or deleted from the dataset before the dataset can be used in the internal model.
Success: No missing risks.

2. Risks in ARM not present in dataset:
The model can be run if ARM contains more risks than the dataset so if you are happy with the missing risks listed here then no action need to be taken.
Success: No missing risks.



5. Risks added in this ORSA cycle.
These risks have been added to the dataset this ORSA cycle. It would be worth going through these risks and checking the data entered on the website is reasonable and that no mistakes have been made.

RiskID	Entity	Risk Description
4710	AUL	Non-compliance with Lloyds requirements
4695	AUL	Breach of prudential regulatory requirements
4694	AUL	Breach of client money rules
4693	AUL	Breach of regulatory requirements - regulatory administration and implementation of regulatory change
4692	AUL	Breach of regulatory requirements - customer treatment - delegated underwriting
4691	AUL	Breach of regulatory requirements - customer treatment post sale
4690	AUL	Breach of regulatory requirements - customer treatment - pre sale and sale
4602	AE	Pension Liability
4635	AE	Changes in the (broker) distribution chain
4744	AIUK	Slow Settlement of Premiums From Brokers
4719	AIUK	Non-compliance with sanctions regimes applying to Amlin companies
4721	AIUK	Breach of financial crime legislation by Amlin Companies – including fraud, anti-money laundering.
4720	AIUK	Breach of Data Protection rules and requirements
4722	AIUK	Failure to obtain required licence
4723	AIUK	Breach of regulatory requirements - customer treatment pre sale and sale
4724	AIUK	Breach of regulatory requirements - customer treatment post sale
4725	AIUK	Breach of regulatory requirements - customer treatment - delegated underwriting
4726	AIUK	Breach of regulatory requirements - regulatory administration and implementation of regulatory change
4727	AIUK	Breach of client money rules
4728	AIUK	Breach of prudential regulatory requirements
4718	AIUK	Breach of anti bribery and corruption law/regualations

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Validation process

- Using Validation process to drive model improvement and use
- Positive inputs from:
  - Back-testing – do loss events appear in line with model outputs?
  - Data quality review and sign-off
  - Sensitivity analysis – is the model responding intuitively?
  - Management review and challenge of model results - extremely valuable process
  - Stress testing using operational risk scenarios
  - Methodology – adoption of scaling tools and improvements in curve fitting

Year of Event	Number of Events	Total Value of losses (GBPk)	Maximum Value of single loss (GBPk)	Average value of loss (GBPk)
2011	34	2,334	0,600	680
2012	58	6,682	4,930	110
2013	39	10,531	10,000	270
2014	5	0	0	0
Average (excluding 2014)	44	6,515	10,000	353

Results for	Mean exposure (GBPk)	Median exposure (GBPk)
Q1 2013	12,361 7,080	5,929 1,584
Q1 2014	13,826 7,964	6,066 2,530

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Use of scaled data

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Scaled data project

- ORIC was asked by its members to create a scaled data capability to support benchmarking and modelling.
- The aim was to produce a practical tool for members whilst establishing a robust and defendable methodological basis, which could be subject to independent scrutiny and validation.
- This had also to be balanced with protecting member's data anonymity.

- The tool was delivered in mid-2014.
- The process has been subject to independent validation by an external consultancy.

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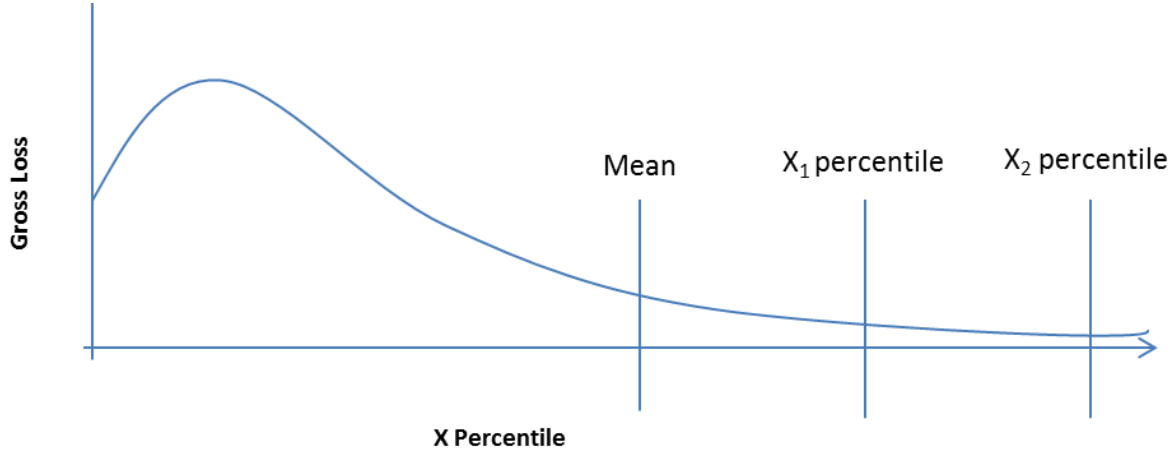
Scaling methodology

- 'Expected Shortfall methodology' – conditional VAR* approach
- Uses the log of the losses to decrease the range while still keeping the proportionality of the data (& mathematical reasons)
- Considers average log loss above specified percentile (from 0 to 100)
- → increasing the percentile X will move the probability more towards the tail events



* Value at risk

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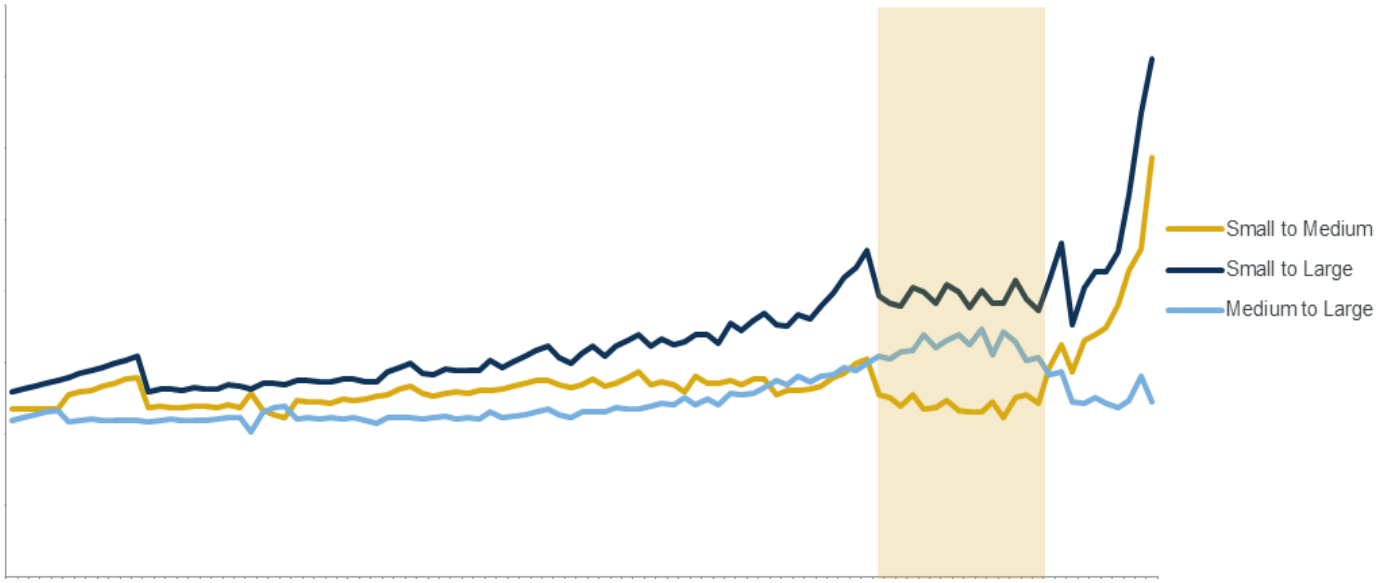
Scaling range selection

- Looking at the relationship between the generated scaling factors across all percentiles (non-life):



- Most stable relationship (with sufficient variation) is found towards the tail.

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Uses of scaled external loss data

- External loss databases have only been around for the last 10-15 years and hence scaling methodologies are still in the initial stages of development.
- Because of this, the current industry effort is on a combination of loss data and other factors such as scenario analysis and BEICFs, rather than pure statistical modelling.
- Modelling focus is on tail distribution, as it is a key driver of the capital figure.
- Current uses for scaled data in the industry include:
  - Direct input into capital models, in combination with internal data;
  - Benchmarking for scenario analysis;
  - Informing tail-shape for LDA or scenario-based models (indirect input).

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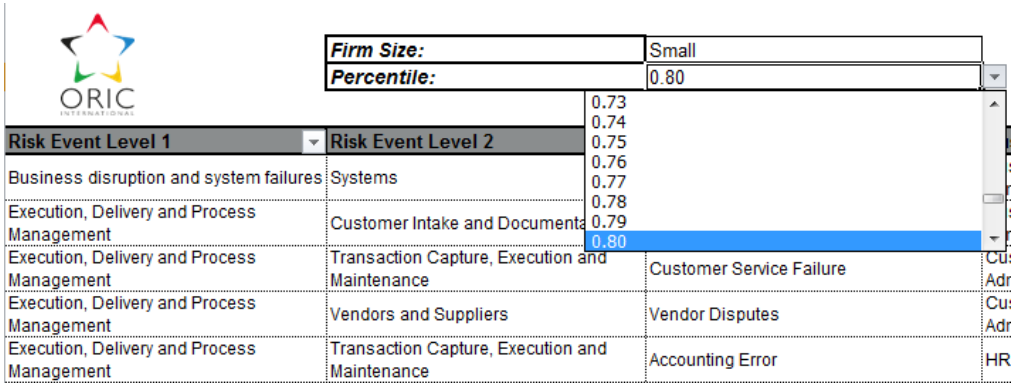
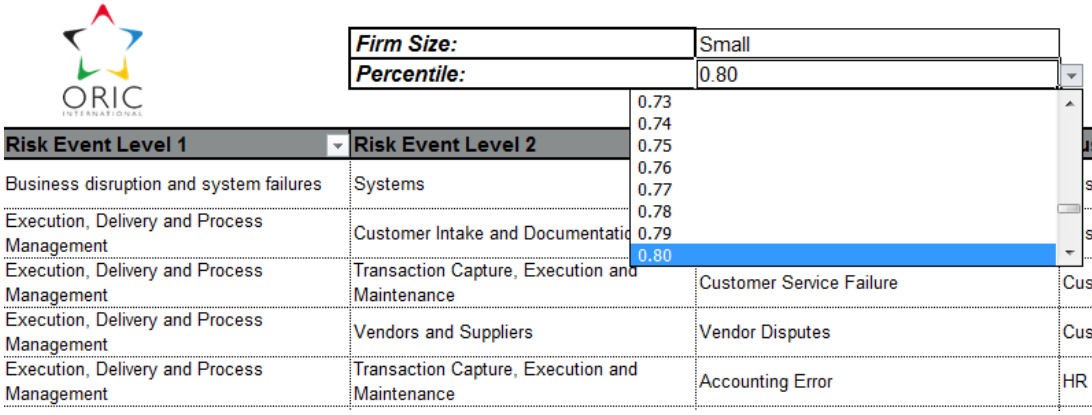
Scaled Outputs: what does it look like?



Firm Size:	Small
Percentile:	0.80

0.73
0.74
0.75
0.76
0.77
0.78
0.79
0.80

Risk Event Level 1	Risk Event Level 2		
Business disruption and system failures	Systems		
Execution, Delivery and Process Management	Customer Intake and Documenta		
Execution, Delivery and Process Management	Transaction Capture, Execution and Maintenance	Customer Service Failure	Cu Adr
Execution, Delivery and Process Management	Vendors and Suppliers	Vendor Disputes	Cu Adr
Execution, Delivery and Process Management	Transaction Capture, Execution and Maintenance	Accounting Error	HR



Firm Size:	Small
Percentile:	0.80

0.73
0.74
0.75
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0.77
0.78
0.79
0.80

Risk Event Level 1	Risk Event Level 2		usiness Function	Financial Status	Scaled Loss Amou
Business disruption and system failures	Systems		stomer Service/Policy Administration	Actual	11579.00
Execution, Delivery and Process Management	Customer Intake and Documentatio		stomer Service/Policy Administration	Actual	7193.78
Execution, Delivery and Process Management	Transaction Capture, Execution and Maintenance	Customer Service Failure	Customer Service/Policy Administration	Actual	44323.71
Execution, Delivery and Process Management	Vendors and Suppliers	Vendor Disputes	Customer Service/Policy Administration	Actual	171312.29
Execution, Delivery and Process Management	Transaction Capture, Execution and Maintenance	Accounting Error	HR	Actual	18677.01

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Encouraging loss event data capture and use

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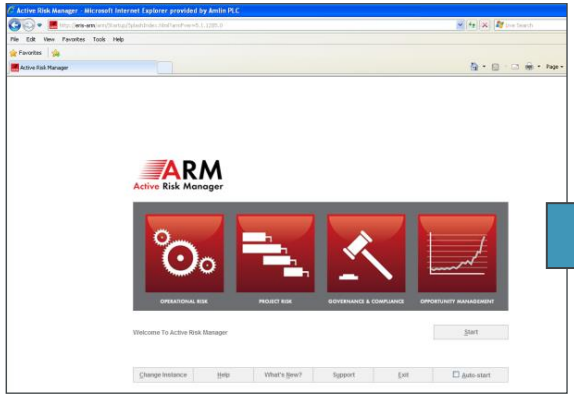
Making it simple and embedded - training



Report Date:		Event Date:	Report Reference:
Raised By Name:		Event Recognised Date:	
Originating Entity:			Single / Group Report:
Originating Function:			Title:
Activity:			
Event(s) Description:			
Event Cause:			Key Control Failure:
Cause Description:			Describe other control failure:
Event Detection Impact:			Failed Key Control Description:
Event Detection Description :			Control Success:
			Describe other control success:
			Successful Control Description:
Risk Event / Near Miss :			
Current Gross Impact/Loss:			Currency:
Near Miss Quantification (£):			Recovery Amount:
Impact/Loss Summary:			Recovery Summary:
Potential Future Impact/Loss:			PotentialFutureRe... Amount:
Potential Impact/Loss Summary:			Potential Recovery Summary:
Resolved/Ongoing:			Event Authority:
Report Approval Status:			Interested Parties:

1. Where do I find the template?
2. What should be reported…
   - Thresholds versus sharing
3. To Whom?
   - Note legal / compliance aspect before reporting!!
4. Why?
   - Avoid repeat
   - Root cause for key events

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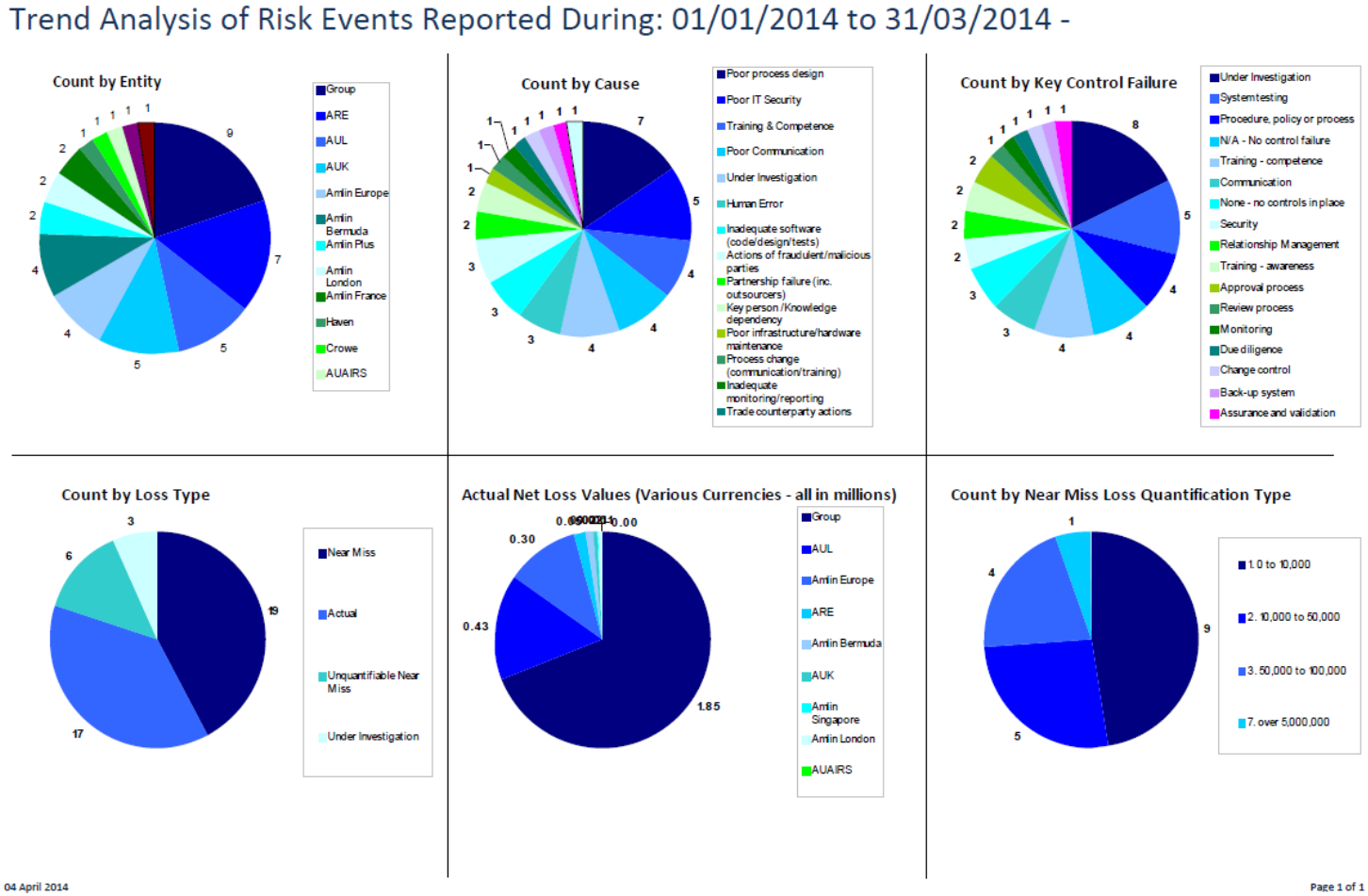
Looking for trends and step-changes



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Actively sharing ‘lessons learnt’ between divisions

Amlin Risk Event 517 (Internal Event)

Reporting date: 15 January 2014

Event Title: Cover-holder breaches binding authority

➢ **Description:**

- A cover-holder has an underwriting guide which clearly shows all the risk they can and cannot write, including risk that had previously been referred for special terms. For this particular cover-holder within the guide there was a paragraph on risks associated with writing business for flood reference postcodes.
- At renewals the cover-holder wrote business within flood zones area **without** referencing to the documented underwriting guide issued to them or to the assigned terms.
- This led to the cover-holder setting up an insurance cover for a property which was **IN** a flood zone postcode, and when it was affected by the floods, and a claim was made by the client – it was only then this risk which previously had special terms imposed became apparent.
- Legal contacted the underwriter to discuss this matter. It was then understood that the cover-holder had breached their authority and not read through their guidelines.

➢ **Consequence:**

- Actual, current loss of £15,000
- A flood occurred at the risk address causing damage estimated at £460,000. Following review by legal and subsequent challenge of underwriters it has been established that had the risk been correctly referred it would have been written but with an increased flood excess of £15,000. A contribution of £15,000 is being sought from the cover-holder.

➢ **Contributing factors:**

- The root cause of this issue is the cover-holder did not read through the guidelines submitted to them and making note the requirements/terms. This shows lack of accountability held from the cover-holder.

➢ **Identified or Proposed actions:**

- **ACTIONS ALREADY ON ARM but IN PROGRESS**; team who will be caring out a file review at the cover-holders office. Underwriter will be contacting the cover-holder to discuss this issue further.
- They will visit the cover-holder for a file review to see if there are other similar issues to this and to give comfort this was an isolated case. This is expected to be done by April/May 2014**.**

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Raising the profile – company staff publication

Risk News

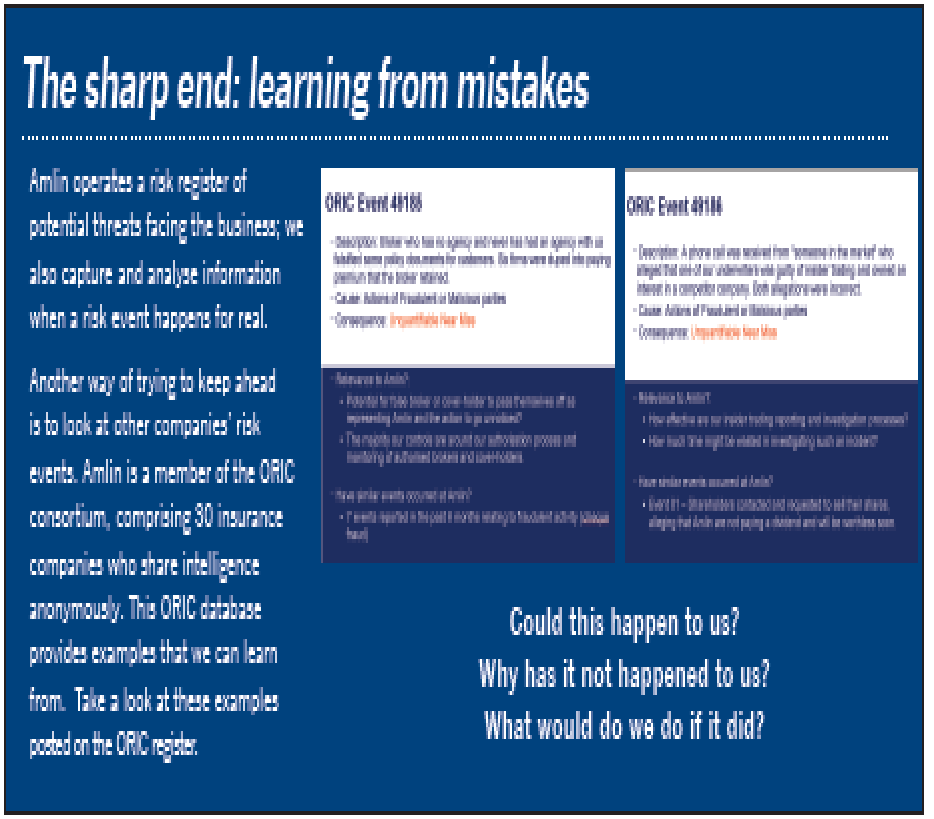
Learning from mistakes

Amlin operates a register of potential risks facing the business. We also capture and anaylse information when a risk event happens for real. When these events happen we review procedures and implement processes to ensure they don't happen again.

Amlin Risk Event

Description: An underwriter asked for approval of a new broker through the correct process. No response was forthcoming and the underwriter initiated the new business without approval. A coverholder had written a risk which appeared to be domiciled in Mozambique. The organisation is only authorised to write risks in Mozambique if there is no local market of the risk, and if we obtain regulatory approval.There was no evidence that the risk had been authorised and the coverholder did not notify Amlin of the risk. Investigation and legal opinion ultimately determined it was a permitted risk, as it was an international risk; this was a near miss. What can we learn from this?

Actions in progress include the Underwriting guide being reviewed and changes being communicated once finalised. How many more incidents like this could we be exposed to- which may not in that case turn out to be legal?



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Cost-Benefit Analysis

- For operational risk every risk mitigation investment involves a cost-benefit decision.
- This comes down to ‘Risk Appetite’.
- Does the reduction of ‘risk level’ justify the resource investment?
- But how do you measure the ‘risk level’?
  - Annualised Cost of Risk (ACOR)
  - Net Present Value (NPV)
  - Risk-adjusted Rate of Return
  - Using a capital model
- Post implementation of mitigation strategy, how do you prove that the ‘risk level’ as been reduced?

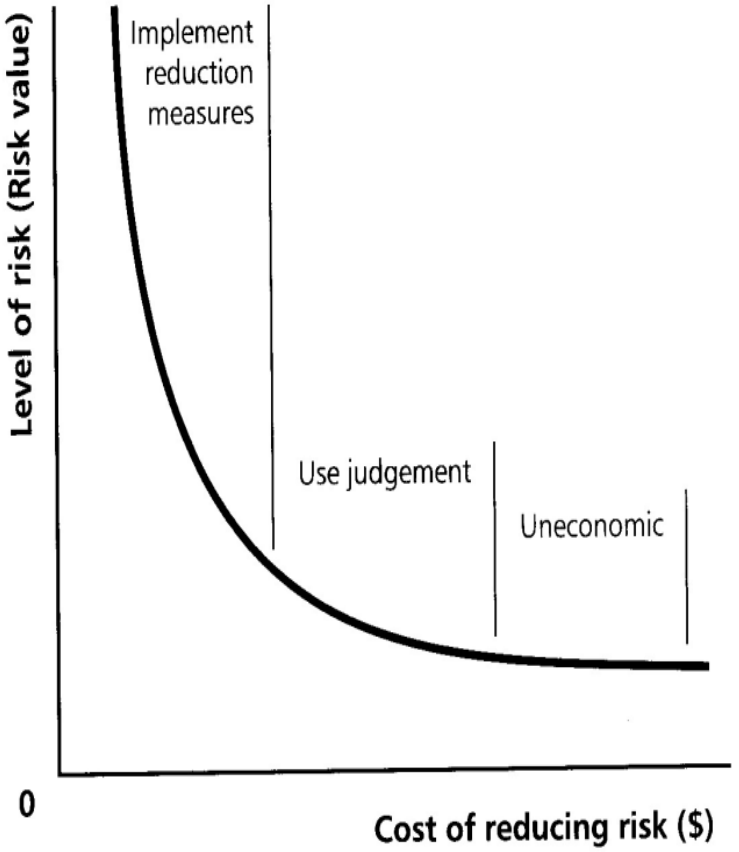

Figure 4.3 Cost of risk reduction measures

(from ANS/NZ 4360 Standard (2004) Risk Management)

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Questions?

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.

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