Institute and Faculty of Actuaries

Marine and Energy Pricing

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Marine & Energy Pricing Working Party

- Darren Farr (Co Chair)
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- Andrew Newman
- Chris Gingell
- David Stuart
- Emma Montague
- Ewa Peacock
- Gemma Dawson
- Giorgia Rama
- Jenny Gardner
- Kiran Patel
- Layna Frontado
- Miriam Lo
- Sejal Haria
- Shamim Ashraf
- Suzanne Hodkinson
- Tony Hartington

Intro

- Presenters
- Audience Mix
- Questions at the end
- Disclaimers
  - Examples Provided Fictional
  - Opinions of us not the Institute, our Employers etc etc…..
- Emphasis on key themes of
  - Communication
  - Relationship
  - Lack of Data
  - The Specifics / Quirks

Paper – Key Areas

Classes of Business	Business Area	Topics
Hull	Pricing!	Pricing
Cargo	*…appreciating cross overs from:*	Rate Change
Protection & Indemnity	Reserving	Exposure Management
Energy Construction	Capital Modelling	Market Survey
Offshore Energy – Exploration and Production	Reinsurance Outwards	
War	Risk Management	
Marine Liability		
Specie	*Briefly Covered*	
Pleasure Boat & Yacht		
Ports & Terminals		
Builders' Risk		

Pricing – Protection & Indemnity ("P&I")

- Started in the 19th Century to fill in gaps in insurance provided by standard commercially available hull policies.
- Constituted as mutual insurance companies by which shipping companies share - or pool - their liabilities.
- Being a mutual, clubs are owned by their members
- Principal risks covered are
  - Injury, illness and death of crew, passengers or other persons
  - Cargo loss or damage
  - Wreck removal
  - Pollution
  - Collision
  - Dock Damage
  - Fines or Administrative penalties

Pricing – Protection & Indemnity ("P&I")

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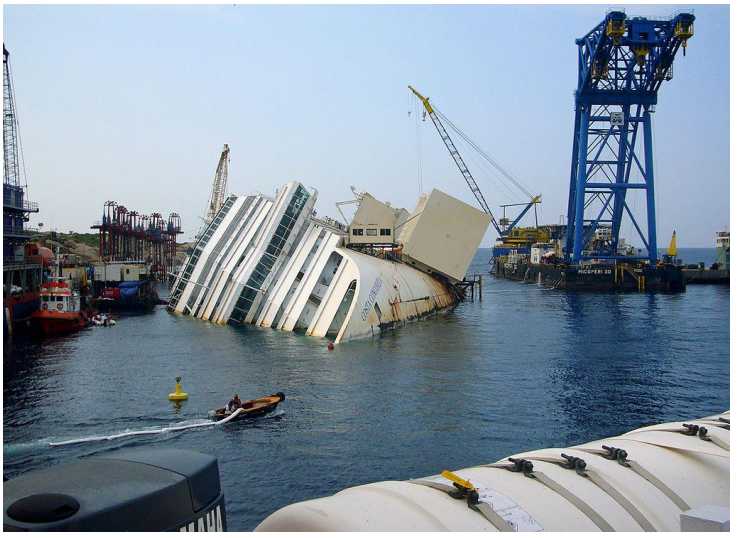

Pricing – Protection & Indemnity ("P&I")

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Pricing – P&I Scenario

Well known P&I Club wants to buy coverage for a "lower pool" participation. Liability class underwriter that writes P&I reinsurances has approached you with the following scenario.

Pricing – P&I Scenario (Part I)

"Well known P&I Club wants to buy coverage for a "lower pool" participation. Liability class underwriter that writes P&I reinsurances has approached you with the following scenario."

"I want a 25 x 25 with 25 in the Agg, excess of the self insured retention of 9, historically it's been 7 but now its 9. Can you price it for me, Oh! Also tonnage has gone up and now its well over a billion tonnes compared to the historic"

- **What does "Lower Pool" mean.**
- **What does 25 x 25 with 25 in the Agg mean.**
- **Self insured retention increased.**
- **Exposure is up. Pay attention to number of vessels. Vessels are big now than ever before.**

Pricing – P&I Scenario (Part II)

"Well known P&I Club wants to buy coverage for a "lower pool" participation. Liability class underwriter that writes P&I reinsurances has approached you with the following scenario."

"the freight rates crashed in 2008 and now we expect it to pick up so may be less claims going forward"

- **Freight rates change and how ships are used change along with it. Higher the rate the more likely the owner would want to keep it working hence lower claims. The harder it works the more likely it is to have losses. Two opposing features.**
- **May be lower smaller claims but possibly higher big claims…**

Pricing – P&I Scenario (Part III)

"Well known P&I Club wants to buy coverage for a "lower pool" participation. Liability class underwriter that writes P&I reinsurances has approached you with the following scenario."

"that is all I have from the broker, claims and tonnes and that is it, we might get to lead so we might be quoting"

- **There is no more information. However its always good to ask the question. Pay attention to what is happening in the market at the moment.**
- **Does this link with events of IGP&I?**
- **We are leading so its important.**
- **How do you price it? Well that is not covered here in this presentation, but consider the above points and read our paper. Its not a how to guide but it will help.**

P&I Scenario Conclusions

- Communication and Relationship
  - Understand what was asked. The words can mean many things
  - Understand the dynamics between the Underwriter and broker.
- Data
  - Need to build databases
- "Quirks" and "Specifics"
  - P&I Club specifics and the International Group Specifics
  - Things that are used in as-if'ing:- Freight rate change, Exposure Change, and the links with claims inflation.

GLMs in Hull

The Scenario: A personal lines pricing actuary joins a Lloyd's Syndicate. The CUO of the Syndicate asks the new recruit to talk to the senior Marine underwriter who is not convinced that her Marine Hull book can be "GLM'd".

GLMs in Hull

GLMs in Hull

GLMs in Hull

GLMs in Hull

- Perception
- Reframe the problem
- Typical relationship
- Understand the business

GLMs in Hull

This ship has some of the world's largest propellers – the blades are 6m in diameter

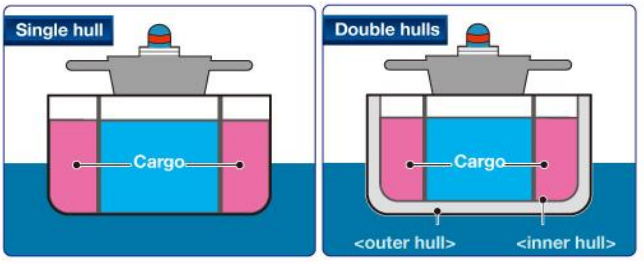
Azipods

Configuration of propellers which can be rotated in any horizontal direction making a rudder unnecessary

Oasis of the Seas	
Vessel type	Passenger cruise
Value	£590m
DWT	15,000 tonnes
Age	4 yrs
Speed	20.3 knots
No propellers	3
Fleet size	40

GLMs in Hull

Brightoil Legend	
Vessel type	Crude oil tanker
Value	£28m
Length	244m
Depth moulded	21 m
Hull type	Double Hull
Ice Indicator	N



Depth moulded

Vertical distance from bottom of the hull to uppermost complete exposed deck

Ice indicator

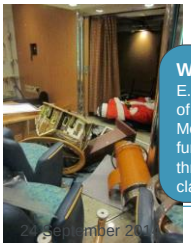
Ships have reinforced hull to help them navigate through sea ice

GLMs in Hull

Peril
Sinking
Piracy
Fire
Weather
Grounding
Machinery & equipment
Collision

Sinking
E.g. Costa Concordia
$512m Hull claim

Grounding
E.g. Noble Hawk bulker
$29m claim



Weather
E.g. cruise ship Brilliance of Seas. Huge waves in Med storm caused furniture and fittings to be thrown around. $1.1m claim.

Collision
Includes collision with dock or other vessels. E.g. in foggy conditions insured container collided with another which broke in half. $6.4m claim.

GLMs in Hull

- **Join the claims and exposures; apply GLM routine**

- **Practical application in Hull**
  - Exposure and observations
  - Working with the underwriter
  - Data quality
  - Realism
  - Claims experience….

GLMs in Hull

- **Experience rating**
  - Residual heterogeneity
  - Theory vs Practice

- **User friendly tool**
  - Day-to-day usability
  - Be in tune with needs

GLMs in Hull: Conclusion

- **Relationship**
  - Build with the underwriter
- **Data**
  - Understand it
- **Quirks**
  - Day to day application
  - It's not motor

Exposure Management

Scenario

The Pricing Actuary is asking his Underwriters for extreme events to allow for Cat losses in the Rating Models

1. "What is the potential of a Cargo loss from a GOM hurricane hitting a major port; e.g. Miami?"
2. "Could another Deepwater Horizon occur? If so, how often and what would it cost?"
3. "How does the RI programme impact on the quantum of losses?"
4. "Our internal database and market data only captures natural hazards – what should we include for man-made events?"

Exposure Management
Conclusions (1)

Communication / Relationship

- Ensure UWs understand why this is important – Cat load is important component of M&E Pricing models
- Need expert judgement from UWs for man-made events
- Ensure brokers provide relevant information
- Understand data needs of reinsurers / reinsurance brokers

Exposure Management
Conclusions (2)

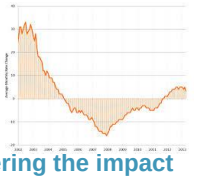
Data Issues

- Issues with vendor Cat models
- So consider alternative methods
- Impact of RI and aggregations

'Quirks' of Marine & Energy

- Cats important constituent of overall technical price; esp. for Energy
- Non-static exposures

Rate Change



Scenario

Challenges faced by the Pricing Actuary every day when considering the impact of rate changes in a 'non-standard' environment….

1. "There's a 10% increase in premium at renewal"
2. "The broker is looking for a 10% LCB this year if the LR is under 50%"
3. "Deductibles 'as expiring'"
4. "Change in T&Cs due to increase passenger liability limits under the Athens Convention"
5. "Rates are up 20% this year – makes up for the 10% reductions each of the last two years"
6. "Cargo renewal now includes storage as well as transit cover"

Rate Change
Conclusions (1)

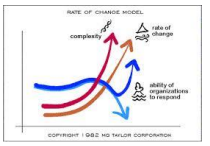
Communication

- Underwriters think additively; Actuaries think multiplicatively!
- Jargon – RARC, LCB etc

Relationship

- UW view of rate change vs Actuarial model output – especially on conditional deductions
- Consider how RARC compares to broker estimates – particularly for facilities

Rate Change
Conclusions (2)



Data Issues

- Ensure correct allocations of rate change into its constituent parts
  - Exposure, Limit, Excess, Deductibles, Terms & Conditions
  - Remainder is the actual rate change
- Worth creating rating indices

'Quirks' of Marine & Energy

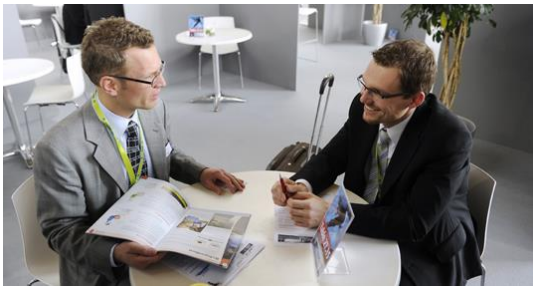
- Subjective judgement often required – chiefly for changes in T&Cs
- Renewals not often straightforward (sometimes even non-comparable) – see our Paper for examples

The Survey

- **Interviewed**
  - Underwriters
  - Senior / chief actuaries
- **Breadth**
  - Brokers
  - Lloyd's syndicates
  - Direct writers and Reinsurers
  - Regulators (PRA)
- **Scenario and results**
  - Similar questions; representative responses
  - Full outputs in the paper

The Survey

Scenario: As part of a due diligence process the potential buyer's CUO separately interviews the target company's Chief Pricing Actuary and Head of Marine and Energy Underwriting.



Survey

- "Do you think your organisation really needs Actuaries? Could you do without them?"
  - Useful at technical price / walk away price.
  - Not so much in a subscription market.

Survey

- “Most actuaries I know work in silos, how well do you think your pricing actuaries really understand the business – T&C, the claims, the broker dynamics and relationships?”
  - Overall good understanding.
  - Can improve on the broker relationship.

Survey

- “My aim is to build an optimal reporting structure within my organisation. What do you think would work best: the pricing actuaries reporting upward to an actuarial team or upward to an underwriting team?”
  - Central – lack of continuity, independent but disconnected with the relationship.
  - Underwriting team – Integrated, “great” relationship but still independent.

Survey

- "What do you most value from the pricing actuaries involvement? What do you least value?"
  - The analysis when there is data
    - Trending
    - Portfolio analysis
    - Complex exposures
  - Not so good when there is no data.

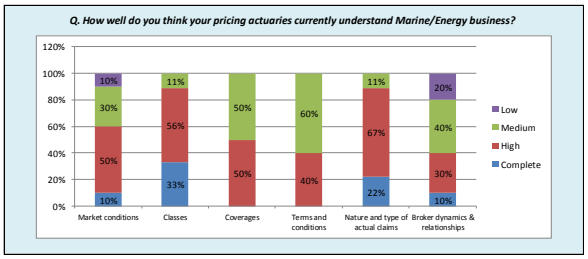
Survey

- "By definition models are always wrong, I understand that pricing actuaries build many models at your company, how reliable do you find them?"
  - Varies by class
  - Most underwriters rely on models to produce a benchmark.
  - Less reliance on risk pricing.

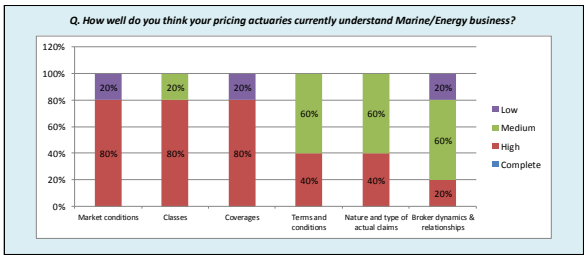
The Survey

- **Q2:** "Most actuaries I know work in silos, how well do you think your pricing actuaries really understand the business – T&C, the claims, the broker dynamics and relationships?"

Underwriters' responses



Actuaries' responses

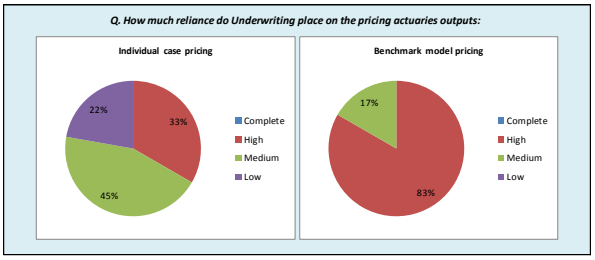


The Survey

- **Q5:** "By definition, models are always wrong, I understand that Pricing actuaries build many models at Co. B, how reliable do you find them?"

- The actual question: How much reliance (Complete, High, Medium or Low) do Underwriting place on the pricing actuaries' outputs for
  - a) case pricing; and
  - b) benchmark pricing

Underwriters' responses



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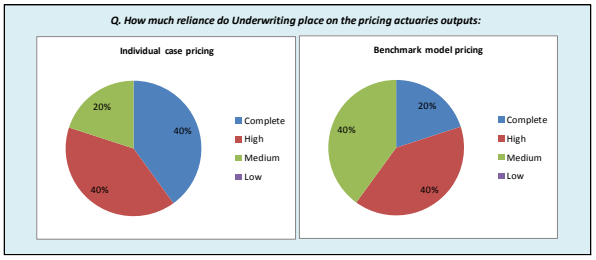

The Survey: conclusions

- **Communication and Relationship**
  - Pricing actuaries are valued
  - More important that reporting structure
- **Lack of data**
  - Actuaries most valued when there is more data
- **Specifics / Quirks**
  - Actuaries valued for modelling complex contracts

Overall Conclusions (1)

Communication

- Jargon / Acronyms
- Complex things, processes always have Jargon. It is a historic thing.
- Demystify actuarial science

Relationship

- Relationship with the underwriter. Understand the broker – underwriter dynamic and the actuary – underwriter dynamic.
- Construct the story of the case you are making. Does the underwriter find you useful.

Overall Conclusions (2)

Lack of Data

- So, no standard approaches.
- Apply Actuarial skill and judgement

The Specifics / Quirks

- It is special and complex
- Give it the time it deserves to understand it

Overall Conclusions (3)

READ OUR PAPER

Questions?