CONFERENCE PAPER

THE GENEVA ASSOCIATION

Accumulation in Liability: A Same Approach as in Property?

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11th Annual Liability Regimes Conference

Keeping the Floodgates Shut? Mastering Accumulation and Bodily Injury Exposures in a Rapidly Changing Environment

4–5 November 2015, Rüschlikon

ACCUMULATION IN LIABILITY: A SAME APPROACH AS IN PROPERTY?

Luc de Lignières - AXA Group P&C CRO

November 4, 2015 / Zurich

"Asbestos is not going to be the next Asbestos"

CRO Forum
Paper on Casualty Accumulation Risk
October 2015

Why?

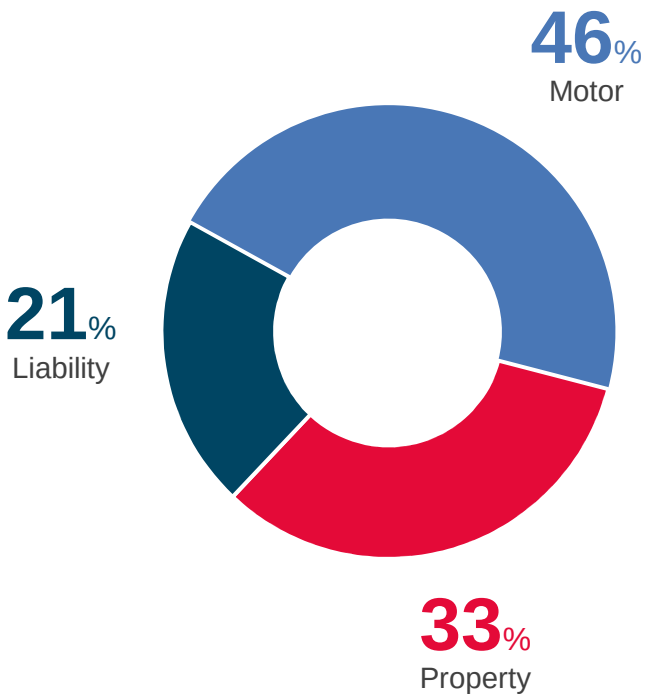
As insurers, to what extent are we aware of accumulation in Liability ?

- Who knows what the major Liability events are?
- The event we tend to focus on: Asbestos
- A huge difference with Property events
  - **Each year, many identified events hit somewhere in the world**
  - **Each year, worldwide major events are listed, quantified and detailed**
  - **Historical databases exist to understand and model these**
- To understand accumulations and elaborate sophisticated approaches in Property, materials abound, but what about in Liability?

2014 Worldwide revenues

Source: AON - Insurance risk study | Tenth edition, 2015

Split per Line of Business



- Total revenues: $ 1,400 bn
- Revenues in Liability: $ 292bn

Major events in Property

Source: Swiss Re - Sigma N°2/2015

Top five CAT property events (as-if 2014)

Insured loss (in billion dollars)

December 2014 view	Where	Year	Amount
Hurricane Katrina	US	2005	78.7
Earthquake	Japan	2011	36.8
Hurricane Sandy	US	2012	36.1
Hurricane Andrew	US	1992	27.0
Terrorism attack on WTC	US	2001	25.1
Total			***203.7***

Over the 2005-2014 period, over 300 catastrophes were profiled every year amounting to an annual average of $70bn insured loss. ~150 of these are man-made events.

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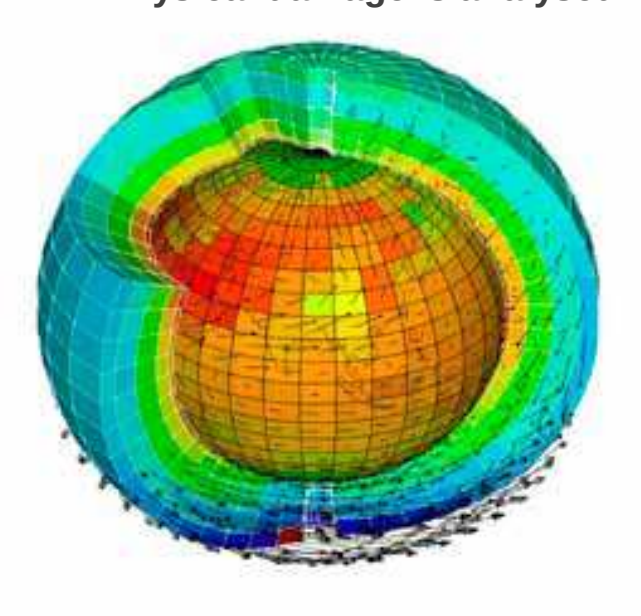
Zoom in on accumulation in CAT property

Property risks benefit from physical modelling (1/2)

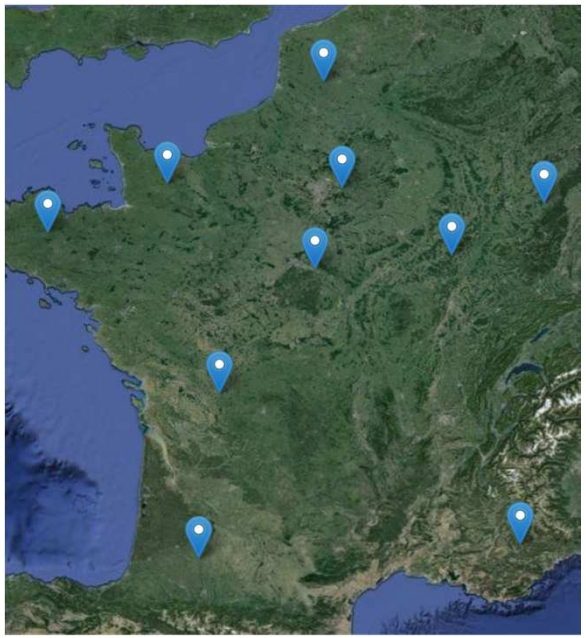
- Loss-generating events can be defined and physically modelled
- Covered events are stipulated in re/insurance wordings
- Academics can help re/insurers understand and model the physical phenomena generating such events
- Buildings' vulnerability can also be modelled with engineering and/or historical data

AND

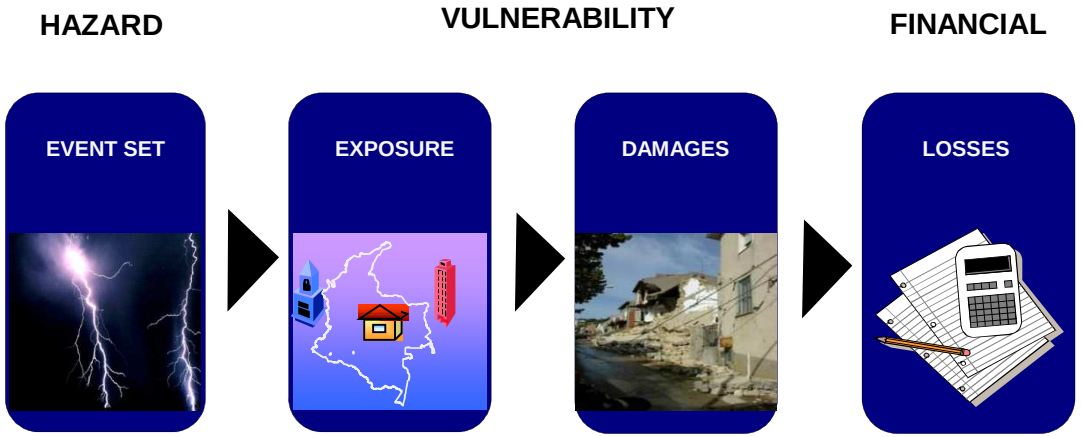
Physical damage is analysed

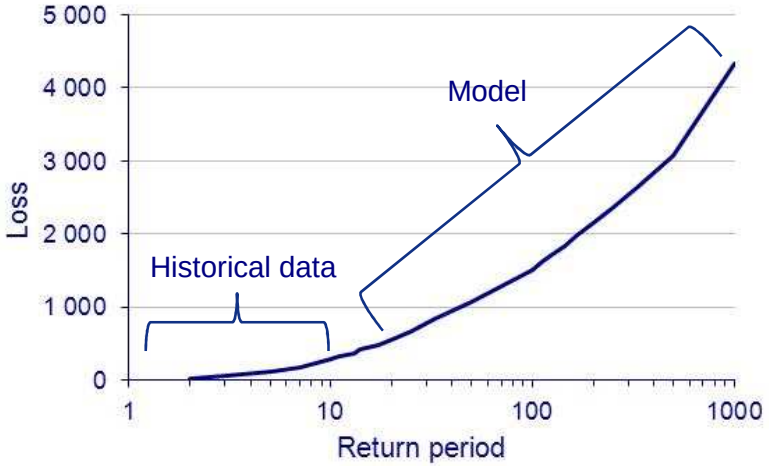


Exposure is known and can be located



Property risks benefit from physical modelling (2/2)

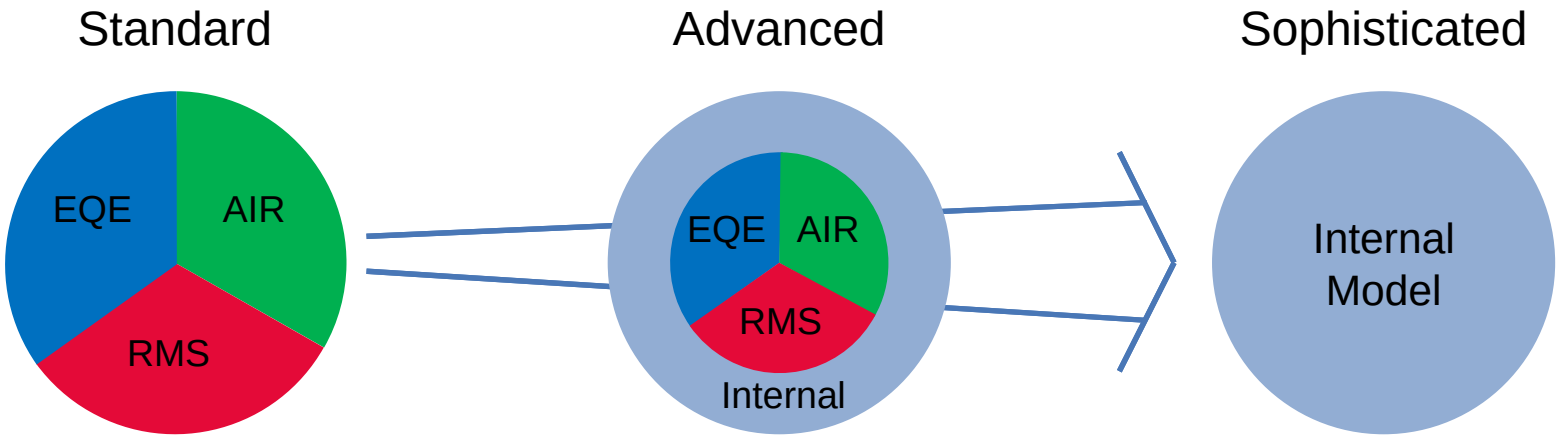




- A loss distribution can be estimated based on the hazard's physical modelling
- Impacts of future deviations such as climate change can be integrated into the modeling
- Geographical correlations (e.g. windstorms) can also be integrated in the modeling

CAT Modelling has been developing since the 80s

- Re/Insurers are gradually equipping themselves



- Models have improved over time on
  - **Spatial resolution (from kilometers to meters)**
  - **Sub perils covered (e.g. tsunamis, storm surges, fires following, …)**
  - **Insurance coverages (e.g. business interruption, engineering, motor, …)**
  - **Validation (notably with integration in the Solvency II framework)**

Accumulation is monitored at the European level

PERILS (Pan European Risk & Insurance Linked Services)

- PERILS AG is an independent reporting agency which was launched in 2009 as a result of an initiative by the Chief Risk Officer Forums

- PERILS provides industry-wide catastrophe insurance exposure and loss data as a subscription service
  - **In an anomymous and secure environment**
  - **Through a common geographical criteria: the CRESTA zone**

- PERILS benefits the industry by:
  - **Significantly improving the knowledge of industry exposure and post-event claims information**
  - **Enhancing individual Re/Insurer's understanding of their risks compared to the market**
  - **Improving underwriting and risk management**
  - **Increasing catastrophe risk capacity through CAT Bonds and ILWs**

- Property Claims Service (PCS) is an organization with a similar purpose, which focuses on the US and Canada

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Differences between accumulations in Liability and Property

How does accumulation in Liability differ from Property?

- Perils cannot be pre-identified … but a common typology can be used
  - **Sudden and accidental events**
  - **Serial aggregation losses**
  - **Systemic losses**

- No geographical area can be associated with a claim…
  - **A toy manufactured in China and distributed in the UK by an Australian distributor injurs a Brasilian child… in the Kinshasa airport**
  - **Breast implant claim**

- Re/Insurers worry about the unknown
  - **How to deliver an insurance cover for emerging risks?**
  - **How to make sure of the adequateness of insurance and reinsurance covers?**
  - **How to deal with time effect?**

- The accumulation cost structure cannot be anticipated
  - **Number of plaintiffs**
  - **Compensation cost (people, goods, no-material damage suffered,…)**

- In focusing on the US market, other markets end up beeing undermonitored
  - **The US: 50% of Commercial General Liability revenues**
  - **16% of P&C business vs 7.5% for the Rest Of World**

Few actuarial skills dedicated to monitoring Liability

- 1 claim results in 1 single uncertainty in Property yet brings about 5 in Liability:
  - **Quantum or amount, (same as Property)**
  - **Liability share (fault, injury, causality link)**
  - **Nature of the claim: occurrence or claims made**
  - **Defense cost**
  - **Cost of time (inflation)**

- Due to the severity oriented claims' structure, modelling is more difficult
  - **One policy = several claimants**
  - **More volatile claims**
    - *Standard Formula in Solvency 2: SCR P&C(without CAT)=function of Premiums and Reserves*

- Poor data – no known experience

- No possible worldwide consolidation as there is no universal definition for damage
  - **Liability schemes differ from one country to another**

- Legal jargon intimidates actuaries: the weight of legal rulings impacts the assessment of accumulation

Liability Lob carries an inherent claims inflation risk

- Claims inflation drivers vary from one line of business to another
  - **Little impact on Property business due to its short tail pattern**
- Claims inflation linked to long-tail patterns generates a major risk of miscalculating the accumulation in liability
- Consumer Price Index's (CPI) evolution does not drive claims inflation in Liability making future insurance costs difficult to predict
  - **Example: Bodily Injury in France**
  - **Expected claims inflation cannot be extrapolated from existing CPI patterns**
- Claims inflation in Liability depends on many drivers
  - **Legal environment (occurrence or claims made)**
  - **Legal or out of court settlements**
  - **Location of the decision-making Court**
  - **Societal environment**
  - **Tax regime changes**
  - **Guarantee content/Impact of deductibles**
  - **Re/Insurer claims handling policy (payment patterns, automated/manual evaluations, annuities/capital,…)**
  - **…**

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Can we capitalize on Property?

How can our property experience serve to better understand accumulation in Liability?

- Make people aware of accumulation in Liability as in Property
  - → **Build standardized databases with major events**
  - → **Go beyond the US and establish an annual worldwide reporting as in Property**

- As in Property, imagine a step-by-step approach for modelling accumulation in Liability
  1. **Select an initial peril**
     - *Sudden and accidental events / Serial aggregation losses / Systemic losses*
     - *In Property, hurricanes and earthquakes were modelled at first ; floods, tsunamis, droughts,… were modelled later*
  2. **Build an equivalent to Property's CRESTA zone**
     - *For example: cover x trade sector x territoriality*
  3. **Define a common exposure measure in Liability**
     - *In Property, "insured value" does not exist in France. It has been rebuilt from the other variables.*
  4. **Identify Liability trajectories (or scenarios) to be associated with return period**
     - *Cf next slide*
  5. **Estimate destruction rates in adequacy based on:**
     - *Past/known losses*
     - *New technologies like big data and forward-looking modelling techniques*

Identify Liability trajectories (or scenarios) to be associated with return period

Liability requires additional expertise

- Expert judgment is crucial to invent scenario trajectories associated with statistical return periods
  - → **A scenario is deterministic and does not provide exceedance probability data points *a priori*.**
  - → **Basic causes can generate mega claims**
    - Stress test elaborated by *Cambridge Centre for Risk Studies: A malicious software market leader insider corrupts a worldwide-used database*
  - → **Elaborating a scenario requires multiple skills**
  - → **Sensitivity analyses are needed to identify the key drivers**
    - *Example: territoriality (France vs the US)*

- A prerequisite: expand actuaries' knowledge in Liability overall to fortify modelling
  - → **Legal environment and contractual**

- Vice-versa, experts in Liability need to vulgarize their vocabulary to strengthen actuaries' accessibility to the ins and outs of the Liability

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Moving forward with Property/Liability events!

Mixed events are our future

- Globalization is accompanied by a much greater degree of interdependency and interconnectedness and bring new vulnerabilities affecting both Property and Liability
- Liability accumulation often surfaces from man-made Property events
- Societal context incentivizes people to seek multiple liable counterparts
- Example: Climate change

Mixed events are our future

Illustration on Climate Change

- Further increase in property claims may arise from climate change in the future

- Those claims may also be linked with an increase in liability claims:
  - **Directly with responsibility sought for not having implemented prevention / adaptation measures able to minimize the natural events' impact**
    - *Ex: Pollution and / or Bodily Injuries consecutive to a flood or hurricane, triggering several cases of liability for construction or utility companies already seen in the US*

  - **Indirectly with responsibility sought for having emitted greenhouse gases triggering climate change**
    - *Ex: Several climate-change related lawsuits in the US to date, which, though unsuccessful so far, could bring about a critical loss accumulation.*