Insurers are like zoos: better with cats!

Paul Eaton
Effective communication how-to
Actuarial Standards Board’s Actuarial Standards of Practice (ASOP)
SECTION 1. PURPOSE, SCOPE, CROSS REFERENCES, AND EFFECTIVE DATE

1.1 PURPOSE

This actuarial standard of practice (ASOP) provides guidance to actuaries with respect to actuarial communications.
So what is an “Actuarial Communication”? 

SECTION 2. DEFINITIONS

The terms below are defined for use in this actuarial standard of practice.

2.1 ACTUARIAL COMMUNICATION

A written, electronic, or oral communication issued by an actuary with respect to actuarial services.
And what are “Actuarial Services”?

2.5 ACTUARIAL SERVICES

Professional services provided to a principal by an individual acting in the capacity of an actuary. Such services include the rendering of advice, recommendations, findings, or opinions based upon actuarial considerations.
Are you my Principals?

2.10 PRINCIPAL

A client or employer of the actuary.
Is this an “Actuarial Document”?

2.2 ACTUARIAL DOCUMENT

An actuarial communication in any recorded form (such as paper, e-mail, spreadsheets, presentations, audio or video recordings, web sites, and court or hearing transcripts). Notes taken by someone other than the actuary are not considered actuarial documents.
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Section 1: Climate Trends
Weather vs. Climate

Today’s Forecast:
Partly Cloudy
High Temp: 91°F

This is Weather.

This is Climate.

Today’s Average High: 86°F
Weather vs. Climate

“Climate is what we expect; weather is what we get.”
– Mark Twain

“Weather is your mood; climate is your personality.”
– Marshall Shepherd

*Climate change is a shift in long-term weather patterns*
Fact: Global Temperatures are Rising
…a fact we all agree on
Fact: Causes of temperature rise

Natural Factors: Solar & Volcanic
Human Factors: Carbon Emissions

Source: NOAA
Provocateur?

define provocative

pro·voc·a·tive
/prəˈvəkətiv/ 4

adjective

causing annoyance, anger, or another strong reaction, especially deliberately.

“a provocative article”

synonyms: annoying, irritating, exasperating, infuriating, maddening, vexing, gallling. More
Fact: Carbon dioxide levels are rising

![Graph showing CO₂ concentration over time with 1950 and 2017 levels indicated.](image-url)
Fact: Correlation Between CO$_2$ & Temperatures

**Carbon dioxide** and the **temperature of our planet** from 800,000 years ago until the present day

Carbon dioxide concentrations are in units of parts per million
Temperature is the difference compared to the average temperature of the past 1000 years in units of degrees Celsius
Figure compiled from the following data sources:
Fact: Oceans Getting Warmer
Fact: Sea ice is melting

Source: Fetterer et al. (2017); NSIDC
Fact: Sea Levels Rising
3.4 DISCLOSURES WITHIN AN ACTUARIAL REPORT

Consideration of the items to be disclosed is an important part of the preparation of any actuarial communication. The actuary should review the list of required disclosure items included in section 4 of this ASOP, and in any other relevant ASOP. Further discussion regarding some of these disclosure items follows:
3.4.3 RELIANCE ON OTHER SOURCES FOR DATA AND OTHER INFORMATION

An actuary who makes an actuarial communication assumes responsibility for it, except to the extent the actuary disclaims responsibility by stating reliance on other sources. Reliance on other sources for data and other information means making use of those sources without assuming responsibility for them. An actuarial communication making use of any such reliance should define the extent of reliance, for example by stating whether or not checks as to reasonableness have been applied. An actuary may rely upon other sources for information, except where limited or prohibited by applicable standards of practice or law or regulation. Further guidance on when such reliance is appropriate, and what the actuary’s responsibilities are when such reliance is stated, is found in ASOP No. 23, Data Quality.
3.4.4 RESPONSIBILITY FOR ASSUMPTIONS AND METHODS

b. If a material assumption or method is selected by another party, the actuary has three choices:

3. If the actuary has been unable to judge the reasonableness of the assumption or method without performing a substantial amount of additional work beyond the scope of the assignment, or if the actuary was not qualified to judge the reasonableness of the assumption, the actuary should disclose that fact as specified in section 4.3.
Things that make you go, “hmm”…

Google search for "coward" showing the dictionary definition:

**cow·ard**

/ˈkou(ə)rð/ (noun)

- a person who lacks the courage to do or endure dangerous or unpleasant things.
- synonyms: waakling, milksop, namby-pamby, mouse, More

About 7,050,000 results (0.60 seconds)
Section 2: Weather Loss Trends
But first…2017

USD 353 billion
USD 134 billion

USD 220 billion
USD 80 billion

Economic cost of hurricanes Harvey, Irma, and Maria
Insured cost of hurricanes Harvey, Irma, and Maria

62%
60%

Percentage of 2017 global economic damage from Harvey, Irma, and Maria
Percentage of 2017 global insurance payouts from Harvey, Irma, and Maria
U.S. Economic Loss: Weather Events

Average Annual Economic Loss (current USD)

- **1980s**: $24 billion
- **1990s**: $37 billion
- **2000s**: $59 billion
- **2010s**: $72 billion

**Economic Total**: $1.8T (1980-2017)

**Insured Total**: $837B (1980-2017)

+3.6% Above Inflation

Source: Impact Forecasting
Loss Driver: Atlantic Hurricanes

Source: Aon Benfield & Colorado State University
Loss Driver: Hail

SPC Hail Reports: 1955-2016

Pre-Doppler Radar
Annual Growth: +1.9%

Doppler Radar era
Annual Growth: +2.5%

Source: Aon Benfield & NOAA
Loss Driver: Precipitation

Percent Change from 1958 to 2012

Source: NOAA
Loss Driver: Drought & Wildfire

Temperature change from 1991 to 2012 compared to 1901 to 1960 average and the 1951 to 1980 average for AK and HI.
Section 3: People Trends
Loss Driver: Bigger & Costlier Homes

Source: U.S. Census
Loss Driver: More Homes

Source: U.S. Census
Loss Driver: U.S. Population Growth Rates

1980-2016: 72% of population increase found in ocean-bordering states

Source: U.S. Census
Loss Driver: U.S. Population Patterns
Greatest Risk Areas

**Study:** For every +1°C increase in global mean temperature, cost impact to US GDP increases by +1.2%

Hsiang, Kopp, Jina, Rising, et al. (2017)
Section 4: Insurance Trends
Workers Compensation Lost Time Frequency

Workers Compensation
Lost-Time Claim Frequency
1990=1.00

Source: Lost-Time Claim Frequency: NCCI 2018 State of the Line Analysis of Workers Compensation Results
General Liability Frequency

Commercial General Liability Multistate Occurrence Frequency
1990=1.00

70%
Structure Fire Loss Frequency

Medical Professional Payment Frequency

Medical Professional Liability Payments Per Licensed Physician
1991=1.00

Source: Payments per Licensed Physician: National Practitioner Data Bank Public Use File, 06/30/2018, U.S. Department of Health and Human Services, Health Resources and Services

61%
Auto Severe Accident Frequency

Automobile Liability
Fatalities Per 100M Vehicle Miles Traveled
1990=1.00

Source: 2016 FARS/GES Annual Report, FHWA August 2018 Traffic Volume Trends
Commercial Lines Are Shrinking

![Graph showing Personal and Commercial Premium as a Percent of GDP over time]

- **Personal and Commercial Premium as a Percent of GDP**
- **Commercial lines**
- **Personal lines**

0.0% 0.5% 1.0% 1.5% 2.0% 2.5% 3.0% 3.5% 4.0%

**Summary:**

Commercial lines are shrinking, while personal lines remain relatively stable.
Because casualty is shrinking (not property)!
Section 5: Capital Trends
2017 was not a great year for reinsurers…

Reinsurer combined ratios
Aon Benfield Aggregate Index of Reinsurers

Source: Company financial statements / Aon Reinsurance Analytics

Aon’s Reinsurance Solutions | 2018 CAS Fall Meeting
Proprietary & Confidential | November 11-14, 2018
2017 was not a great year for reinsurers...

Reinsurer return on equity
Aon Benfield Aggregate Index of Reinsurers

Source: Company financial statements / Aon Reinsurance Analytics
But global reinsurer capital is still at all time highs

Source: Company financial statements / Aon Reinsurance Analytics
Alternative capital sustained losses, but still grew

Source: Aon Securities Inc.
Catastrophe bonds – on record pace in 2018

Source: Aon Securities Inc.
Insurance-linked securities are attractive…

Source: Bloomberg, Aon Securities Inc. Data from 12/31/2000-6/30/2017
…and the investor pool is enormous

Pension & Other Investors
- Pension Funds: $32T
- Life Insurers: $10T
- Sovereign Wealth Funds & Endow.: $6.5T

Insurers & Reinsurers
- Rated and Leveraged Model
- Insurance & Reins. Capital: $4.2T
- Reinsurance Capital: $0.6T
Section 6: The Point
Insurance Premium to GDP – several past cycles

Sources: A.M. Best’s Aggregates and Averages, IMF World Economic Outlook Database (www.imf.org), SNL Financial, Aon Benfield Analytics, World Bank Databank (www.worldbank.org)
US GDP based on revised July 31, 2014 methodology by US Bureau of Economic Analysis
But prior cycles driven by casualty, not property

Sources: A.M. Best's Aggregates and Averages, IMF World Economic Outlook Database (www.imf.org), SNL Financial, Aon Benfield Analytics, World Bank Databank (www.worldbank.org)

US GDP based on revised July 31, 2014 methodology by US Bureau of Economic Analysis
Innovation deficit in insurance…

Calendar Year Incurred Loss % of GDP

Sources: A.M. Best’s Aggregates and Averages, IMF World Economic Outlook Database (www.imf.org), SNL Financial, Aon Benfield Analytics, World Bank Databank (www.worldbank.org)

US GDP based on revised July 31, 2014 methodology by US Bureau of Economic Analysis
...opportunities for innovation

Global Risk Management Survey risk ranking

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<th>Damage to reputation/brand</th>
<th>Economic slowdown/slow recovery</th>
<th>Increasing competition</th>
<th>Regulatory/legislative changes</th>
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<td>Cyber crime/hacking/viruses/malicious codes</td>
<td>Failure to innovate/meet customer needs</td>
<td>Failure to attract or retain top talent</td>
<td>Business interruption</td>
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<td>Political risk/uncertainties</td>
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<td>Commodity price risk</td>
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Takeaway

Climate uncertainty drives higher property insurance demand and represents a manageable, positive long-term opportunity for insurers and reinsurers
Next Steps

Potential solutions and steps forward

- Further integration of private insurance markets and federal governments
- Insurance risk pools
- Recommend key risk mitigation metrics to governments or policyholders
- Introduce “Parametric Insurance” to new markets
- Catastrophe modelling
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