

# The role of reinsurance

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## 2nd International Insurance Supervision Seminar

Beatenberg August 9, 2006

by

Mark Lucas  
Managing Director of U.S. RE (Europe) and  
Director of U.S. RE Corporation

# U.S. RE - About the Company

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## U.S. RE Corporation

- Headquarters in New York
- Founded 1988
- One of the largest independent reinsurance brokers and consultants in USA
- Branch offices in Atlanta, Basel, Bermuda, Miami

## U.S. RE (Europe)

- European branch office of U.S. RE Corporation
- Founded in 1994 in Copenhagen by Mark Lucas
- July 1999 moved to Basel
- Active European-wide
- Traditional and non-traditional reinsurance products
- Capital market instruments
- 7 employees in Basel

# The Reinsurance Broker

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- Hired by the insurance company
- Negotiate and place reinsurance covers
- Handle legal documentation
- Handle premiums and claims (cashflow)
- Prepare underwriting information
- Advise insurance company in reinsurance matter

# Risk Factors

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**Fluctuations in the  
Capital Market**

**Natural Catastrophes**



**Insurance  
Company**

**Frequency Losses**

**Large Losses**

# Forms of reinsurance

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**Facultative**

**Treaty**

# Types of reinsurance

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## **Proportional**

- Quota Share Treaty
- Surplus Treaty
- Facultative Obligatory

## **Non-Proportional**

- Excess of Loss Treaty
- Stop Loss Treaty

## Example of no reinsurance

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### **No reinsurance:**

Max. underwriting limit: EUR 20,000,000  
any one risk

### **Result:**

Gross premium written: EUR 40,000,000  
Gross losses: EUR 35,000,000  
Gross result EUR 5,000,000  
Gross loss ratio: 87,5%

As no reinsurance is taken out the gross result equals the insurers net result.

# Example of Quota Share reinsurance

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## Quota share reinsurance:

Max. underwriting limit:	EUR 20,000,000 any one risk Sum Insured
Retention:	25% - EUR 5,000,000 any one risk
Ceded:	75% - EUR 15,000,000 any one risk
Commission:	20%

## Result:

	<b>Gross</b>	<b>Retained 25%</b>	<b>Ceded 75%</b>
Gross premium written:	40,000,000	10,000,000	30,000,000
Commission (20%)		6,000,000	-6,000,000
Losses	35,000,000	-8,750,000	-26,250,000
Result	5,000,000	7,250,000	-2,250,000
Loss ratio	87,5%		87,5%
Combined ratio			107,5%



# Example of Surplus Treaty reinsurance

Max. underwriting limit:	EUR 20,000,000 any one risk Sum Insured
Retention 1 line:	EUR 5,000,000 any one risk Sum Insured
Treaty capacity (ceded) 3 lines	EUR 15,000,000 any one risk Sum Insured
Commission:	20%

## Cessions profile:

Retention:	5,000,000
Capacity (ceded)	15,000,000

Policy limit	Retained limit	Ceded limit	Retained %	Ceded %	Gross Premium	Ret. premium	Ceded premium
20,000,000	5,000,000	15,000,000	25%	75%	500,000	125,000	375,000
4,000,000	4,000,000	-	100%	0%	42,000	42,000	-
7,000,000	5,000,000	2,000,000	71%	29%	145,000	103,571	41,429
6,500,000	5,000,000	1,500,000	77%	23%	100,000	76,923	23,077
18,000,000	5,000,000	13,000,000	28%	72%	750,000	208,333	541,667
4,500,000	4,500,000	-	100%	0%	87,000	87,000	-
11,000,000	5,000,000	6,000,000	45%	55%	820,000	372,727	447,273
20,000,000	5,000,000	15,000,000	25%	75%	1,000,000	250,000	750,000
20,000,000	5,000,000	15,000,000	25%	75%	1,500,000	375,000	1,125,000
5,500,000	5,000,000	500,000	91%	9%	75,000	68,182	6,818
4,800,000	4,800,000	-	100%	0%	58,000	58,000	-
5,100,000	5,000,000	100,000	98%	2%	63,000	61,765	1,235
4,800,000	4,800,000	-	100%	0%	39,000	39,000	-
<b>131,200,000</b>	<b>63,100,000</b>	<b>68,100,000</b>			<b>5,179,000</b>	<b>1,867,502</b>	<b>3,311,498</b>

# Example of a Proportional reinsurance program

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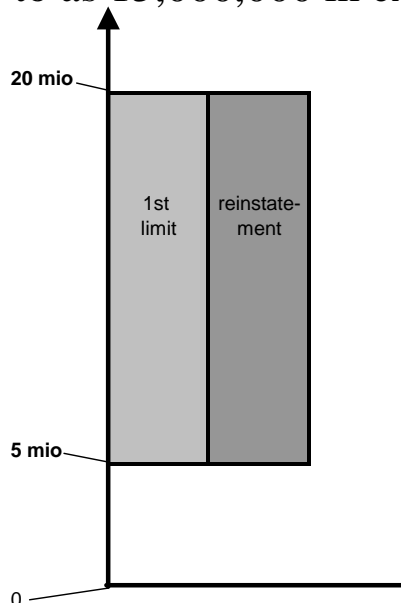
# Example of Excess of Loss Treaty reinsurance

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Retention:	5,000,000
Limit:	15,000,000
Reinstatement:	1 full at 100% additional premium, pro rata as to amount

Subject premium income (S.P.I.):	144,000,000
Rate:	1.25%
M&D Premium:	1,800,000
To earn:	1,800,000
Rate on Line( r.o.l.):	1,2%

Cover is referred to as 15,000,000 in excess of 5,000,000.



## Example of losses

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Loss f.g.u.	Retention	To cover
10,000,000	5,000,000	5,000,000
5,500,000	5,000,000	500,000
15,000,000	5,000,000	10,000,000
7,800,000	5,000,000	2,800,000
4,800,000	4,800,000	-
3,000,000	3,000,000	-
17,500,000	5,800,000	11,700,000
12,500,000	12,500,000	-
<b>76,100,000</b>	<b>46,100,000</b>	<b>30,000,000</b>

# Reinstatement premium calculation

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Loss f.g.u.: 15,000,000

Loss to treaty: 10,000,000

Reinstatement premium calculation (based on M&D premium):

$$\frac{10,000,000 \times 1,800,000}{15,000,000} = 1,200,000$$

# Example of Stop Loss Treaty reinsurance

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S.P.I: 250,000,000

Limit: 75% or 187,500,000 whichever is the lesser  
in excess of

Retention: 120% or 300,000,000 whichever is the greater

All losses in the portfolio protected are accumulated for the period and when the loss ratio exceeds the retention the reinsurance is triggered.

## Loss example:

The aggregated losses for the period are 342,000,000. This is equal to a loss ratio of 136.8%.

The reinsurance treaty pays 75% loss ratio in excess of 120% loss ratio.

This example:

Loss ratio 136.8% - 120% = 16.8% x 250,000,000 = 42,000,000

# Catastrophe reinsurance

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**Life**

**Non- Life**

# The Life catastrophe market

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## Day zero:

WTC attacks on 11. september, 2001.

## Human losses

Deaths:	2,551 passive deaths
	425 fire fighters
<u>Total</u>	<u>2,976</u>
Seriously injured:	215



## Economic consequences

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USA's government	USD 7,500,000,000
Insurance payout	USD 2,000,000,000
Voluntary contributions	USD 1,100,000,000
Total	USD 9,100,000,000

### **Average payment pr. person:**

Passive deaths:	USD 3,100,000	
herof insurance:	USD 713,000	(est.)
Firefighters:	USD 4,400,000	
herof insurance	0	

# Immediate market consequences

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- Reinsurance capacity was drastically reduced
- Costs of catastrophe capacity increased by 300-1.500%
- Exclusions of af NBC terrorism
- New reinsurance capacity in London and Continental Europe
- Contract format was tightened

## Further important factors

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- Focus on the catastrophe risk exacerbated by:
  - South East Asian tsunami 26 december, 2004
  - Assumed increased terrorism risk in Denmark

# Non-life insurance

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Day Zero: 3. december, 1999 (Anatol)

## **Before 1999:**

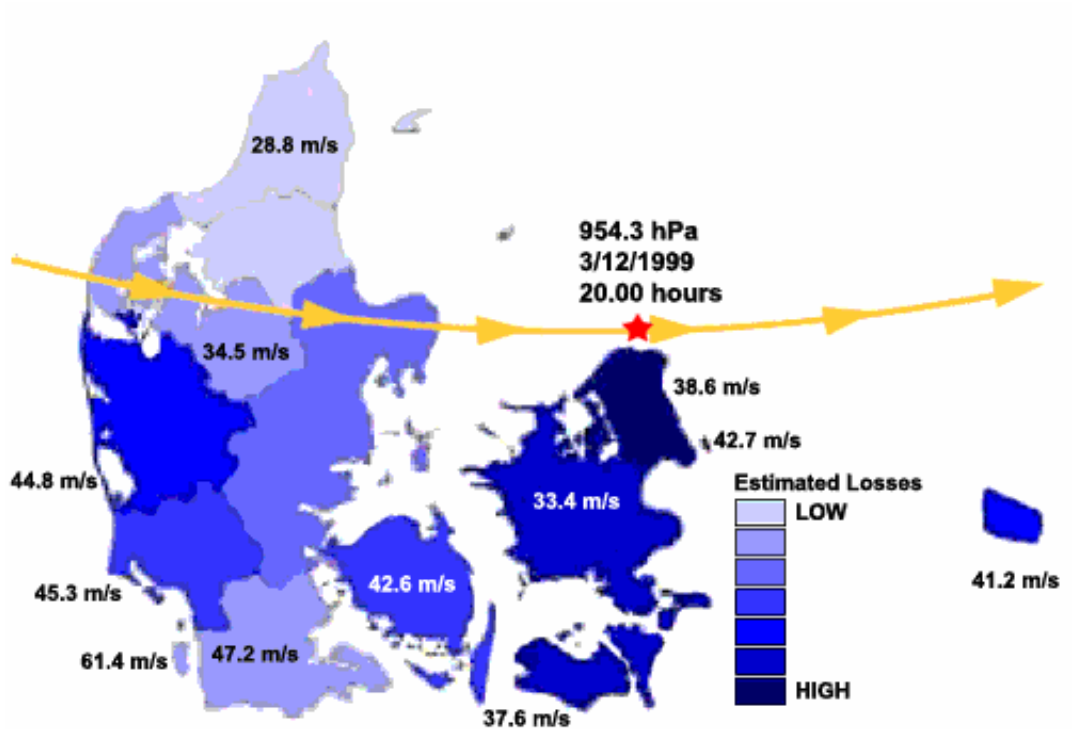
- Catastrophe protections based on 1981 storm adjusted for inflation.

## Facts about Anatol

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- Lowest pressure measured to 952.4 hPa, and fell 60 hPa in 36 hours
- Gusts of hurricane strength (excess 118 km/h) in most of the country
- Highest wind speed *minimum* 185 km/h
- First loss estimate from the industry:  
DKK 1,200,000,000

# Anatol 3. December, 1999



Anatols track, airpressure, windspeed in the gusts as well as distribution of losses

Source: Converium 2001

## Final result

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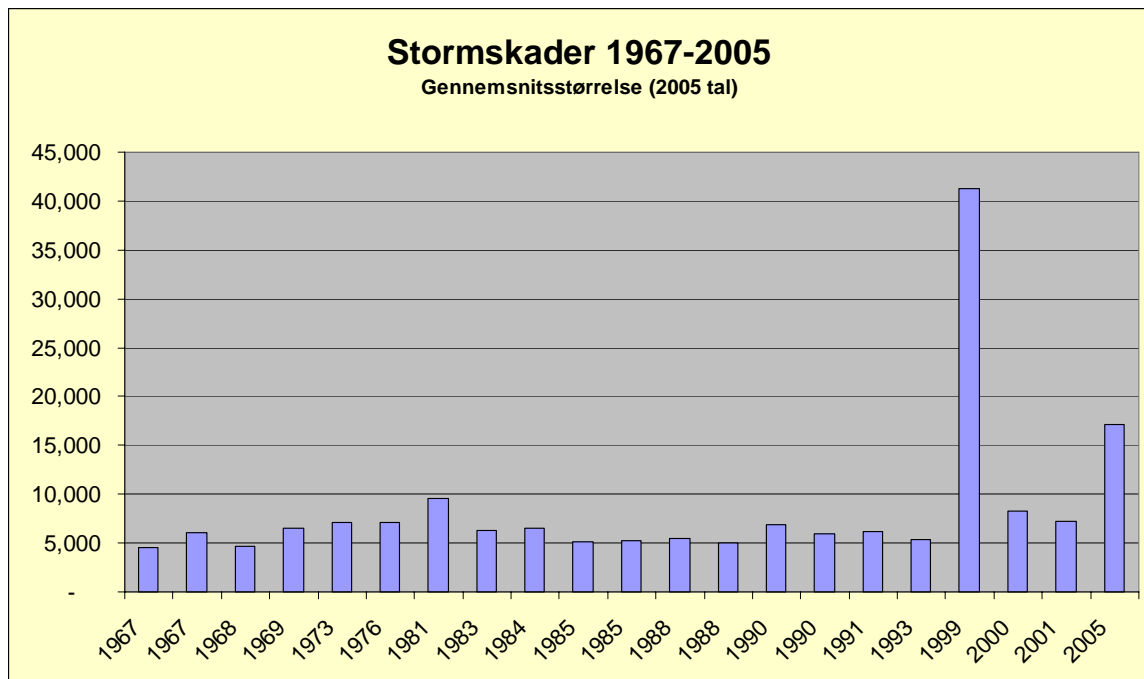
- No of claims: 385,000
- Total gross claim: 14,000,000,000
- Average claim: 36,000
- Total net claim: 7,000,000,000

## Old storm losses

År	Antal skader	Faktisk skade	Indekseret skade	Faktisk skade i snit	Indeks. skade i snit
1967	72,000	44,000,000	323,710,292	611	4,496
1967	82,000	67,000,000	492,922,490	817	6,011
1968	13,000	9,000,000	61,305,882	692	4,716
1969	30,000	30,000,000	197,386,364	1,000	6,580
1973	7,000	10,000,000	50,086,505	1,429	7,155
1976	14,400	28,000,000	101,834,171	1,944	7,072
1981	188,000	827,000,000	1,788,692,566	4,399	9,514
1983	80,000	275,000,000	505,155,457	3,438	6,314
1984	97,000	366,000,000	632,579,104	3,773	6,521
1985	22,000	69,000,000	113,917,879	3,136	5,178
1985	25,000	80,000,000	132,078,700	3,200	5,283
1988	16,000	60,000,000	87,882,621	3,750	5,493
1988	12,600	43,000,000	62,982,545	3,413	4,999
1990	76,400	385,000,000	524,382,498	5,039	6,864
1990	45,000	195,000,000	265,596,330	4,333	5,902
1991	26,700	123,000,000	163,604,411	4,607	6,128
1993	97,000	407,000,000	523,673,333	4,196	5,399
1999	385,000	14,000,000,000	15,881,661,442	36,364	41,251
2000	40,000	300,000,000	330,668,190	7,500	8,267
2001	20,000	135,000,000	145,369,165	6,750	7,268
2005	244,323	4,174,000,000	4,174,000,000	17,084	17,084



# Average claims size



## Further important details

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- The lateral movement of the storm system was fast
- Northern Jutland, Aarhus and Copenhagen escaped relatively lightly

# Consequences of Anatol

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- *All* larger insurance companies in Denmark broke through their reinsurance program
- The reinsurance programs were subsequently increased by a factor 3-4
- The reinsurance premiums increased drastically after Anatol
- Prices have been falling in the meantime
- Increased demand for information
- Tendency to move the renewal away from January 1

# Do insurance companies buy sufficient reinsurance protection?

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- Anatol is not the largest storm which could hit Danmark
- The weather is becoming progressively more extreme
- The insured values are increasing
- The values are being geographically concentrated;
- When will the next (super)Anatol strike?

# Who decides?

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- Management
- Rating agencies
- Regulatory authorities
- Modeling agencies

# Catastrophe modeling

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*What can insurers do to ensure that they have adequate catastrophe reinsurance?*

- A tool to calculate the probability for the frequency and intensity of storms
- Completely dependent of the data input
- Completely dependent of the input assumptions
- All reinsurers use catastrophe models