

CHRISTOPHER GROSS CONSULTING

CREATIVE SOLUTIONS TO COMPLEX PROBLEMS

LOB-4: Reserving for Construction Risks

Approaches you may find Useful

Presented by:

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Agenda

- General Liability
 - Construction Defect
 - Premises Exposure
- Workers Compensation
- Auto Liability
- Pollution Liability
- Professional Liability
- Subcontractor Default
- Builders Risk

Construction Defect

- Trigger
 - Accident date may be continuous and impact multiple annual policy terms
 - Triggers are different by state
- Completed Operations Coverage
 - Like Products Liability, provides insurance for claims resulting after a construction project is completed
 - This feels like Claims Made
 - Statute of Limitations/Repose

Accident Year Ultimate

- Current Case Incurred
- Case Development from the Report Year analysis – allocate to Accident Year
- True IBNR from Frequency-Severity process

Report Year Closed Counts

Data set for example purposes only – not to be considered typical

| | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 | Period 8 | Period 9 | Period 10 |
|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| 1996 | | 5 | 1 | | | | | | | |
| 1997 | 8 | 6 | 10 | 1 | | 2 | 2 | | | |
| 1998 | 11 | 12 | 1 | 4 | -1 | | | | | |
| 1999 | 6 | 6 | 8 | 9 | 2 | -1 | 2 | | 6 | |
| 2000 | 12 | 7 | 7 | 4 | 6 | 10 | | | 2 | |
| 2001 | 6 | 26 | 24 | 8 | 4 | 1 | 3 | | 9 | |
| 2002 | 19 | 34 | 17 | 7 | 4 | 7 | 5 | | 8 | |
| 2003 | 20 | 18 | 30 | 13 | 8 | 6 | 4 | | 7 | |
| 2004 | 18 | 43 | 20 | 20 | 9 | 8 | 11 | | 16 | |
| 2005 | 25 | 41 | 37 | 18 | 8 | 10 | 2 | | 7 | |
| 2006 | 20 | 67 | 46 | 22 | 10 | 12 | 3 | | 9 | |
| 2007 | 51 | 49 | 38 | 15 | 7 | 10 | -2 | | 2 | |

Report Year Reported Counts

Data set for example purposes only – not to be considered typical

| | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 | Period 8 | Period 9 | Period 10 |
|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| 1996 | 9 | -3 | | | | | | | | |
| 1997 | 30 | -5 | 3 | | 1 | | | | | |
| 1998 | 28 | -1 | 2 | -1 | | -1 | | | | |
| 1999 | 35 | 8 | -1 | | -5 | -1 | | | 3 | |
| 2000 | 50 | 3 | -5 | -2 | -1 | 1 | | | 2 | |
| 2001 | 87 | -3 | -11 | 4 | | | 1 | | 3 | |
| 2002 | 106 | -2 | -4 | -6 | 1 | 1 | 1 | | 3 | |
| 2003 | 135 | -17 | -10 | -8 | 1 | 1 | 1 | | 3 | |
| 2004 | 191 | -53 | 3 | -3 | 1 | 1 | 1 | | 5 | |
| 2005 | 225 | -65 | -13 | -7 | 1 | 1 | 1 | | 5 | |
| 2006 | 273 | -75 | -9 | -9 | 1 | 2 | 1 | | 6 | |
| 2007 | 247 | -69 | -9 | -8 | 1 | 1 | 1 | | 5 | |

Report Year Statistics

Data set for example purposes only – not to be considered typical

Ultimate by Report Year

| Year | Count | Dollars | Severity |
|------|-------|------------|----------|
| 1996 | 6 | 40,767 | 6,795 |
| 1997 | 29 | 898,216 | 30,973 |
| 1998 | 27 | 919,365 | 34,051 |
| 1999 | 39 | 4,944,698 | 126,787 |
| 2000 | 48 | 10,105,585 | 210,533 |
| 2001 | 81 | 13,922,857 | 171,887 |
| 2002 | 100 | 5,746,417 | 57,464 |
| 2003 | 106 | 7,908,048 | 74,604 |
| 2004 | 146 | 7,666,647 | 52,511 |
| 2005 | 147 | 15,997,441 | 108,826 |
| 2006 | 189 | 10,615,451 | 56,166 |
| 2007 | 170 | 19,793,786 | 116,434 |



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Accident Year Closed

Data set for example purposes only – not to be considered typical

| | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 | Period 8 | Period 9 | Period 10 | Period 11 | Period 12 | tail |
|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|------|
| 1996 | | 6 | 3 | 10 | 3 | 4 | 9 | 11 | 7 | 12 | 7 | 2 | 4 |
| 1997 | 7 | 12 | 9 | 4 | 5 | 4 | 13 | 1 | 10 | 7 | 8 | 1 | 3 |
| 1998 | 3 | 4 | 2 | 5 | 7 | 4 | 3 | 14 | 11 | 19 | 26 | 5 | 10 |
| 1999 | 5 | 5 | 4 | 7 | 3 | 9 | 6 | 3 | 6 | 12 | -6 | | 2 |
| 2000 | 6 | 6 | 16 | 5 | 10 | 7 | 2 | 3 | -16 | 16 | 2 | 2 | 5 |
| 2001 | 1 | 17 | 31 | 23 | 20 | 14 | 27 | 11 | 16 | 22 | 13 | 4 | 9 |
| 2002 | 2 | 17 | 4 | 20 | 15 | 20 | 7 | 13 | 12 | 25 | 14 | 4 | 9 |
| 2003 | 2 | 5 | 14 | 11 | 37 | 13 | 10 | 15 | 16 | 28 | 16 | 5 | 11 |
| 2004 | 4 | 15 | 18 | 40 | 23 | 19 | 50 | 16 | 50 | 34 | 27 | 7 | 14 |
| 2005 | 3 | 9 | 23 | 10 | 23 | 14 | 3 | 16 | 11 | 31 | 16 | 5 | 11 |
| 2006 | 2 | 12 | 14 | 10 | 19 | 12 | 5 | 13 | 11 | 26 | 14 | 4 | 10 |
| 2007 | 2 | 5 | 9 | 7 | 12 | 8 | 4 | 9 | 8 | 17 | 9 | 3 | 7 |

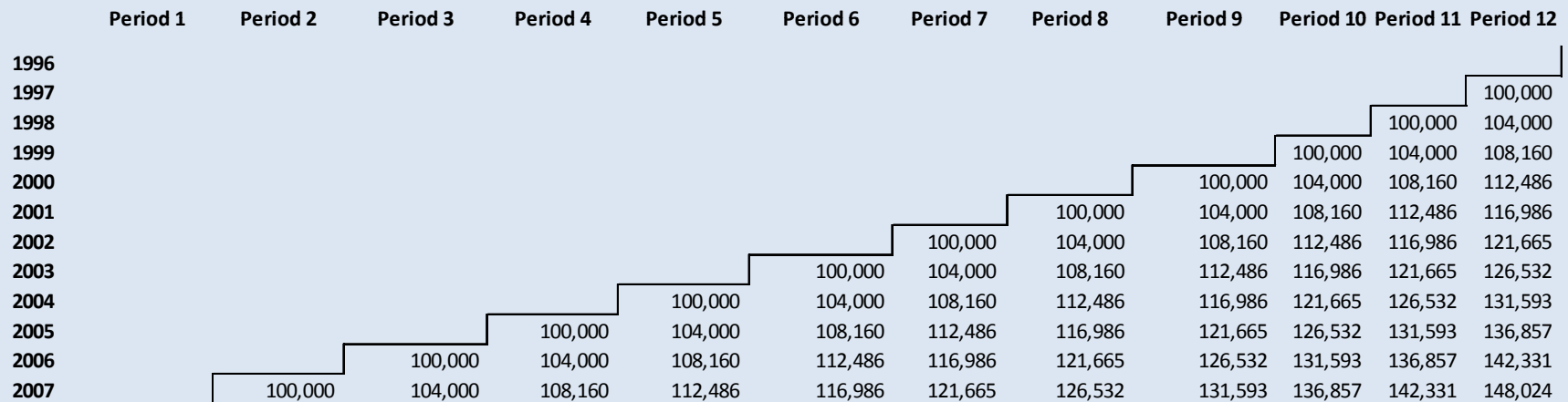
Accident Year Reported

Data set for example purposes only – not to be considered typical

| | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 | Period 8 | Period 9 | Period 10 | Period 11 | Period 12 | tail |
|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|------|
| 1996 | 9 | 9 | 2 | 7 | 10 | 10 | 16 | 15 | 9 | -2 | -5 | -2 | 0 |
| 1997 | 18 | 14 | 10 | 4 | 17 | 8 | 7 | 5 | 4 | -1 | -2 | | 0 |
| 1998 | 7 | 7 | 7 | 10 | 7 | 4 | 28 | 14 | 26 | 3 | | | 0 |
| 1999 | 13 | 10 | 8 | 5 | 6 | 8 | 3 | 2 | | 1 | | | 0 |
| 2000 | 29 | 15 | 9 | 1 | 4 | 3 | 1 | | 1 | 1 | | | 0 |
| 2001 | 29 | 34 | 30 | 28 | 26 | 43 | 4 | 10 | 2 | 2 | | | 0 |
| 2002 | 19 | 30 | 29 | 9 | 25 | 25 | 14 | 8 | 2 | 2 | | | 0 |
| 2003 | 21 | 33 | 41 | 16 | 18 | 26 | 15 | 9 | 2 | 2 | | | 0 |
| 2004 | 28 | 30 | 60 | 69 | 37 | 45 | 27 | 15 | 3 | 3 | | | 0 |
| 2005 | 29 | 19 | 21 | 21 | 18 | 21 | 14 | 7 | 21 | 2 | 1 | | 0 |
| 2006 | 18 | 22 | 30 | 19 | 18 | 22 | 13 | 7 | 1 | 1 | | | 0 |
| 2007 | 4 | 5 | 7 | 10 | 6 | 5 | 6 | 2 | 54 | 1 | 1 | 1 | 0 |

Severity by Report Year/Accident Year

Data set for example purposes only – not to be considered typical



Incremental Ultimates

Data set for example purposes only – not to be considered typical

| | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 | Period 8 | Period 9 | Period 10 | Period 11 | Period 12 |
|------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1996 | | | | | | | | | | | | |
| 1997 | | | | | | | | | | | | |
| 1998 | | | | | | | | | | | | |
| 1999 | | | | | | | | | | | | |
| 2000 | | | | | | | | | 100,000 | 104,000 | | |
| 2001 | | | | | | | | 1,000,000 | 208,000 | 216,320 | | |
| 2002 | | | | | | | 1,400,000 | 832,000 | 216,320 | 224,973 | | |
| 2003 | | | | | | 2,600,000 | 1,560,000 | 973,440 | 224,973 | 233,972 | | |
| 2004 | | | | | 3,700,000 | 4,680,000 | 2,920,320 | 1,687,296 | 350,958 | 364,996 | | |
| 2005 | | | | 2,100,000 | 1,872,000 | 2,271,360 | 1,574,810 | 818,901 | 2,554,971 | 253,064 | 131,593 | |
| 2006 | | | 3,000,000 | 1,976,000 | 1,946,880 | 2,474,701 | 1,520,816 | 851,657 | 126,532 | 131,593 | | |
| 2007 | | 500,000 | 728,000 | 1,081,600 | 674,918 | 584,929 | 729,992 | 253,064 | 7,106,032 | 136,857 | 142,331 | 148,024 |

New Issues

- No known claims
- Severity may be determinable/homogeneous
- Potential for lack of coverage
- Hits the entire diagonal at once
- Do you include in overall data in the future

Industry Data – Chinese Drywall

- Method 1: CPSC.gov Drywall Information Center
- Method 2: Import data (100,000 total homes)
- Method 3: Import data (36,000 total homes)

| | Method One | | | Method 2 | | Method 3 | |
|----------------|-----------------------------|--------------------------|----------------------|---------------------------|----------------------|---------------------------|----------------------|
| | Industry Reported Incidents | Allocate Impacted Home # | Company Market Share | # Homes Imported by State | Company Market Share | # Homes Imported by State | Company Market Share |
| State 1 | 669 | 19,060 | 381 | | - | 3,431 | 69 |
| State 2 | 227 | 6,467 | 129 | | - | 1,164 | 23 |
| State 3 | 194 | 5,527 | 111 | | - | 995 | 20 |
| State 4 | 249 | 7,094 | 142 | 14,500 | 290 | 3,887 | 78 |
| State 5 | 2,031 | 57,863 | 1,157 | 85,000 | 1,700 | 25,715 | 514 |
| <u>State 6</u> | <u>140</u> | <u>3,989</u> | <u>80</u> | <u>500</u> | <u>10</u> | <u>808</u> | <u>16</u> |
| Total | 3,510 | 100,000 | 2,000 | 100,000 | 2,000 | 36,000 | 720 |

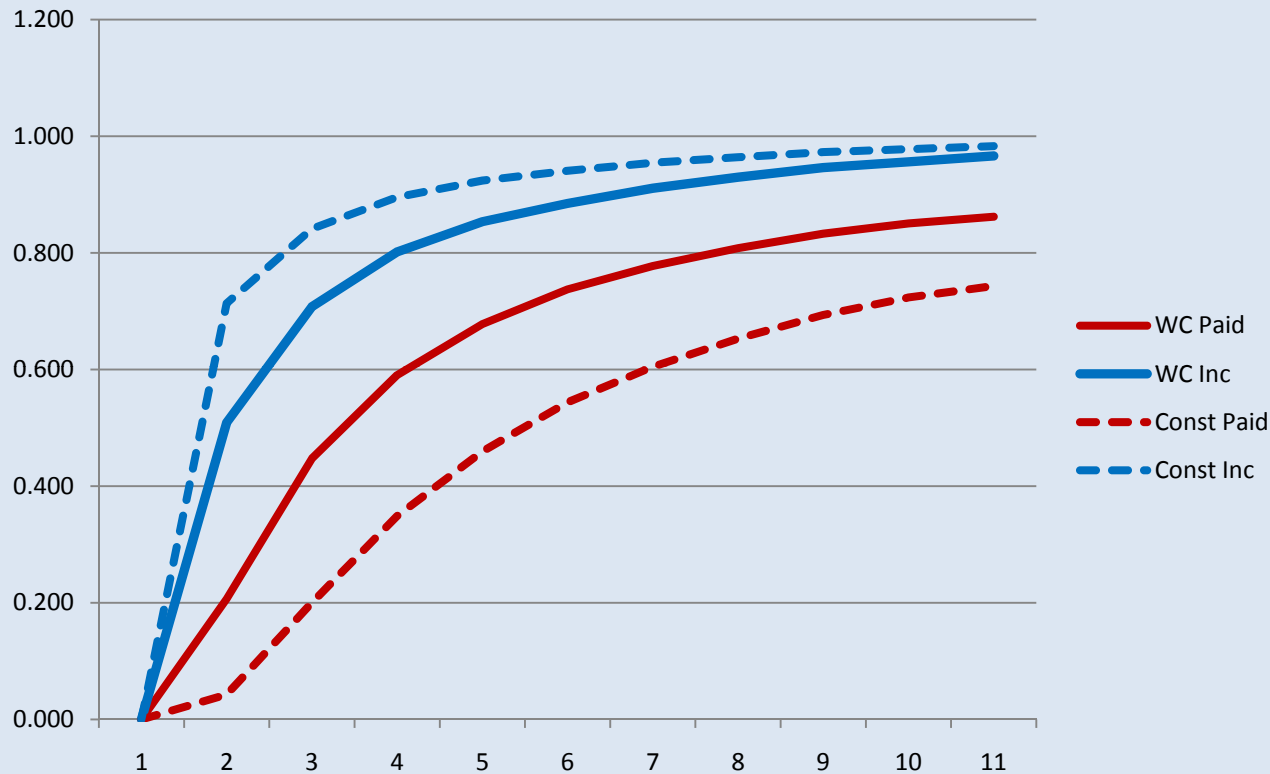
Added Adjustments

- Coverage triggers
 - Manifestation states with expiring/new policies
- How does the Pollution Exclusion apply
 - There may only be LAE in some states
- How does ALAE apply
- How do policy deductibles apply
- How do claims/claimants work in these states and for this policy
- How do policy aggregates apply
- Potential for BI Exposure

GL Premises Exposures

- Mix
 - Premises versus Products
 - Construction Defect versus non
- Large Loss
- High Severity / Low Frequency
- Mix with Construction Defect
 - Different mix of overall Premises versus Products (Construction Defect) due to building type such as Commercial versus Residential versus Heavy Highway
 - Different Trades impacted differently
 - Jurisdictions

Workers Compensation



- Losses are known faster since they are more severe
- Payment patterns are slower since there are a higher percentage of lifetime benefits cases on younger workers

Auto Liability

- Higher Severity
- Many vehicles used primarily on the job site – less frequency
- Use standard methods that allow you to cap losses and add back in a large loss load



Pollution Liability

- Sub limits
- Model as a percentage of General Liability if there are limited or no claims

Professional Liability

- Claims made (usually)
- Known claims can “blow up” – review open claims
- Look at frequency and the % of claims closed without payment to find the expected changes year to year

Subcontractor Default

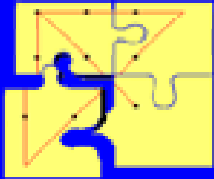
- Surety data may be a good place to start
- Use frequency and severity methods with parameters based on the size of the subcontract
- Model for all subcontracts individually

Builders Risk

- Buildings in progress – values are variable
- Sprinklers, etc. may not yet be installed
- Unknown expiration date, is EP a good measure of exposure
- Do you have “Master” policies?
- Soft costs with delayed expiration date
- Additional insured impact on subrogation
- Impact of catastrophes, deductibles, etc.

Overall

- Higher Severity
- Losses with defined accident dates are known quickly
- Losses without defined accident dates impact the development in interesting ways



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