Basic Track I

2009 CLRS

September 2009

Chicago, IL

Introduction to Loss Reserving

- CAS Statement of Principles
  - Definitions
  - Principles
  - Considerations
- Basic Reserving Techniques
  - Paid Loss Development Method (PLDM)
  - Incurred Loss Development Method (ILDM)

Definitions

- What is a Loss Reserve?

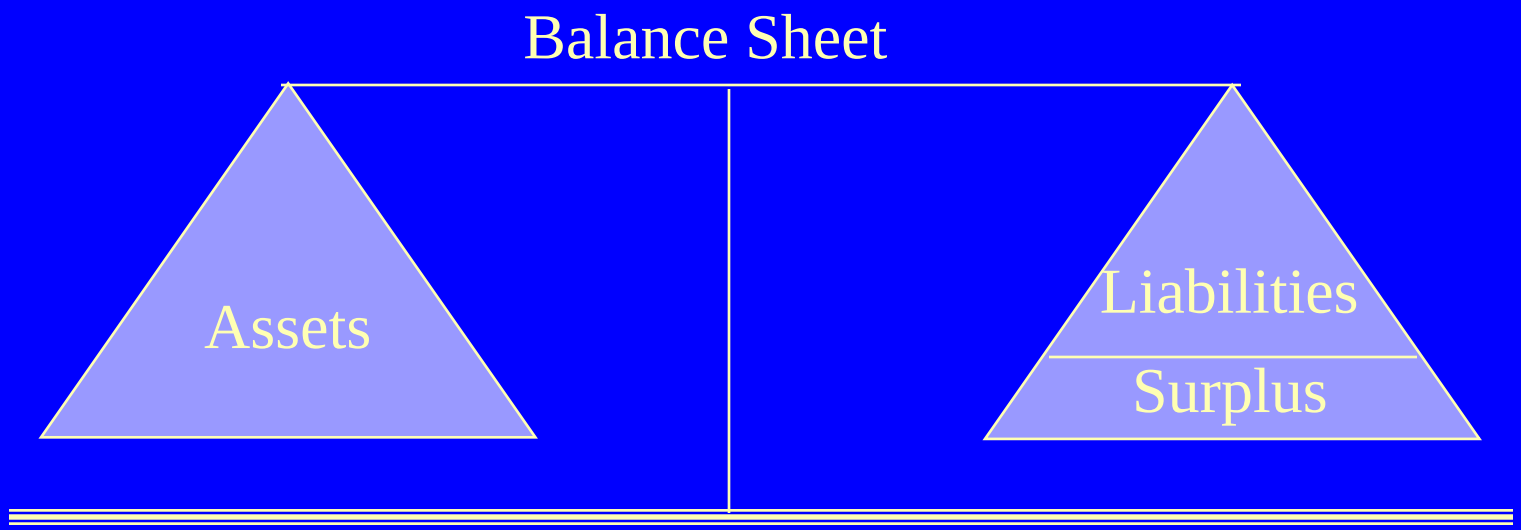
  Amount necessary to settle unpaid claims

- Why are Loss Reserves Important?

  Accurate evaluation of financial condition & underwriting income

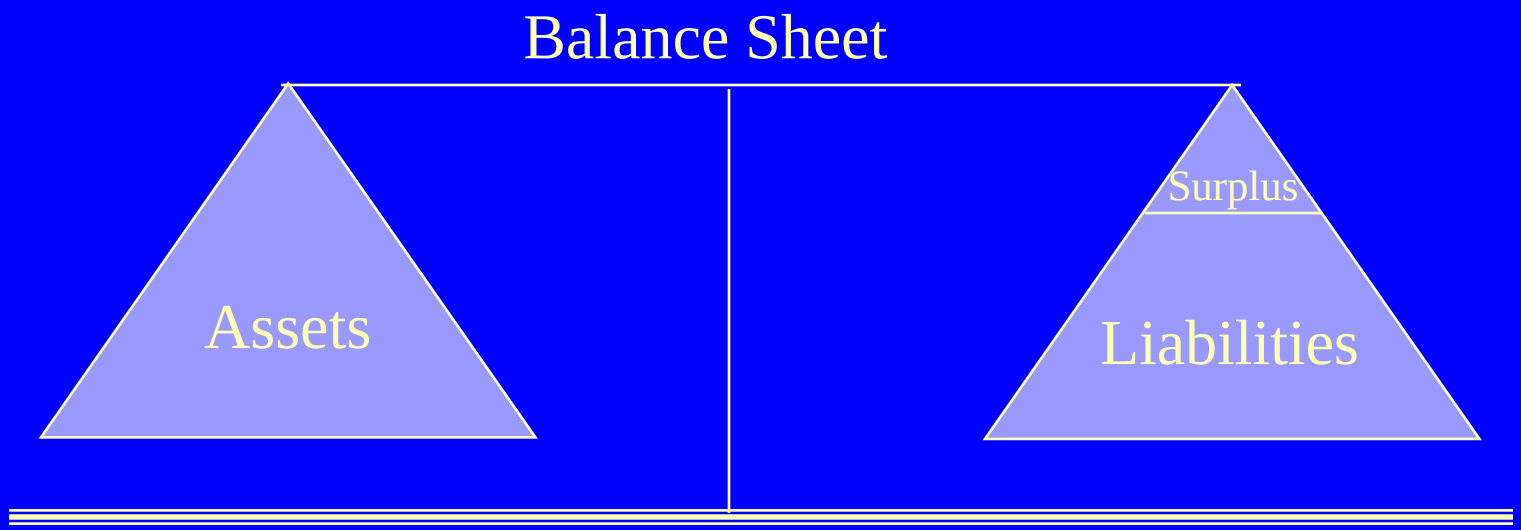
Definitions

- Accounting Aspects of Loss Reserves



Definitions

- Accounting Aspects of Loss Reserves



Definitions

- Carried Loss Reserve

  The amount shown in a published statement or an internal statement of financial condition.

- Indicated Loss Reserve

  The amount that results from the application of a particular loss reserving method.

- Reserve Margin/Deficit

  The difference between an indicated loss reserve and a carried loss reserve.

Definitions

- Elements of a Loss Reserve
  - Formula Reserve/Case Reserve
  - Development on Known Claims
  - Reopened Claims Reserve
  - Incurred But Not Reported (IBNR)
  - Claims in Transit

Life Cycle of a Claim Reserve

7/8/08
Accident occurs

Pure IBNR

7/11/08 Accident reported

Claims in Transit

8/1/08
Accident entered into records as $1,000 Formula Reserve

10/5/08
Individual reserve established

$10,000 Case Reserve

1/1/09
Estimate revised

$25,000 Case Reserve

8/18/09
Settlement agreed

$30,000 Case Reserve

8/25/09
Payment sent

$30,000 Case Reserve

9/2/09
Claim draft clears

Claim Closed

$ 0 Case Reserve

Definitions

- Case Reserves
  - Claim reported but not yet paid
  - Assigned a value by a claims adjuster or by formula
- Bulk + IBNR reserves include:
  - Reserves for claims not yet reported (pure IBNR)
  - Claims in transit
  - Development on known claims
  - Reserves for reopened claims

Definitions

- Loss Adjustment Expenses (LAE) are sum of:
  - Defense & Cost Containment (DCC) Expense
  - Adjusting and Other (AO)

Definitions

- Loss Adjustment Expenses (LAE) are sum of:
  - Defense & Cost Containment (DCC) Expense
    - Allocated Loss Adjustment Expense (ALAE)
    - Includes all defense, litigation, and medical cost containment related expenses, whether internal or external to a company.
    - In general, includes costs associated with controlling the severity of cases.

Definitions

- Loss Adjustment Expenses (LAE) are sum of:
  - Adjusting & Other (AO) Expense
    - Unallocated Loss Adjustment Expense (ULAE)
    - Includes all claims adjusting expenses, whether internal or external to a company.
    - In general, includes costs associated with recording and adjusting cases.

Definitions

- Reserves = Outstanding
  = Liabilities = Unpaid
  = Case Reserves + IBNR
- Incurred losses may have various meanings!
  - Ultimate Losses (incl. IBNR)
  - Reported Losses (excl. IBNR)

Principles

- Actuarially sound reserves
  - based on *estimates*
  - derived from reasonable *assumptions*
  - using appropriate *methods*
- Inherent Uncertainty
  - a range can be actuarially sound
  - true value known only after all claims settled

Principles

- Most appropriate reserve depends on:
  - relative likelihood of estimates in range
  - financial reporting context

Considerations: Data Organization

- Accident Date
  - The date on which the loss occurred.
- Report Date

  - The date on which the loss is first reported to the insurer.
- Recorded Date
  - The date on which the loss is first entered into the statistical records of the insurer.

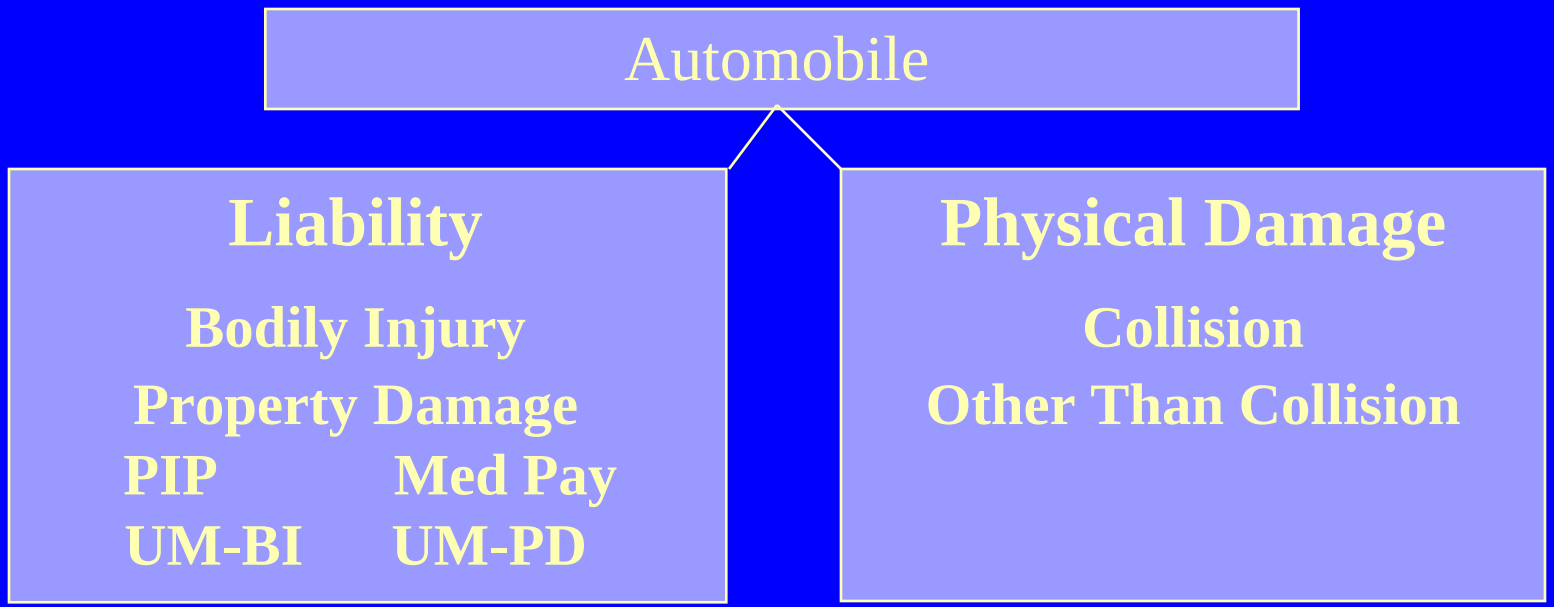
Considerations: Data Organization

- Accounting Date
  - Defines a group of claims for which liability may exist.
  - All claims incurred on or before the accounting date.

- Valuation Date
  - Defines the time period for which transactions are included when evaluating the existing liability.

Considerations: Homogeneity

Accuracy is often improved by subdividing experience into groups exhibiting similar characteristics.



Considerations: Credibility

- A measure of the predictive value that is attached to a body of data.
- A group of claims should be large enough to be statistically reliable.
  - May be a point at which partitioning will divide the data into groups too small to provide credible development patterns.
- Use of supplementary data sources
  - Examples include industry data, countrywide data.

Basic Reserving Techniques: Definitions

- Loss Development

  The financial activity on claims from the time they occur to the time they are eventually settled and paid.

- Triangles

  Compiled to measure the changes in cumulative claim activity over time in order to estimate patterns of future activity.

- Loss Development Factor

  The ratio of losses at successive evaluations for a defined group of claims (e.g. accident year).

Basic Reserving Techniques:
Compilation of Paid Loss Triangle

- The losses are sorted by the year in which the accident occurred.
- The payments from inception are summed at the end of each year.
- Losses paid to date are shown on the most recent diagonal.
- The data is organized in this way to highlight historical patterns.

Basic Reserving Techniques:

Compilation of Paid Loss Triangle

Accounting Configuration

Goal: Calculate the total paid-to-date

Accident Year	Cumulative Paid Losses ($000 Omitted) Cumulative Accident Year Paid as of Year End					
	2003	2004	2005	2006	2007	2008
2003	3,780	6,671	8,156	9,205	9,990	10,508
2004		4,212	7,541	9,351	10,639	11,536
2005			4,901	8,864	10,987	12,458
2006				5,708	10,268	12,699
2007					6,093	11,172
2008						6,962

Basic Reserving Techniques:

Compilation of Paid Loss Triangle

Actuarial Configuration

Goal: Estimate the total ultimately paid

Accident Year	Cumulative Paid Losses ($000 Omitted) Development Stage in Months						Final Total Cost
	12	24	36	48	60	72	
2003	3,780	6,671	8,156	9,205	9,990	10,508	???
2004	4,212	7,541	9,351	10,639	11,536		???
2005	4,901	8,864	10,987	12,458			???
2006	5,708	10,268	12,699				???
2007	6,093	11,172					???
2008	6,962						???

Basic Reserving Techniques:

Paid Loss Development Factors

Accident Year	Evaluation Interval in Months					
	12-24	24-36	36-48	48-60	60-72	72 to Ultimate
2003	1.765	1.223	1.129	1.085	1.052	???
2004	1.790	1.240	1.138	1.084		
2005	1.809	1.240	1.134			
2006	1.799	1.237				
2007	1.834					
2008						

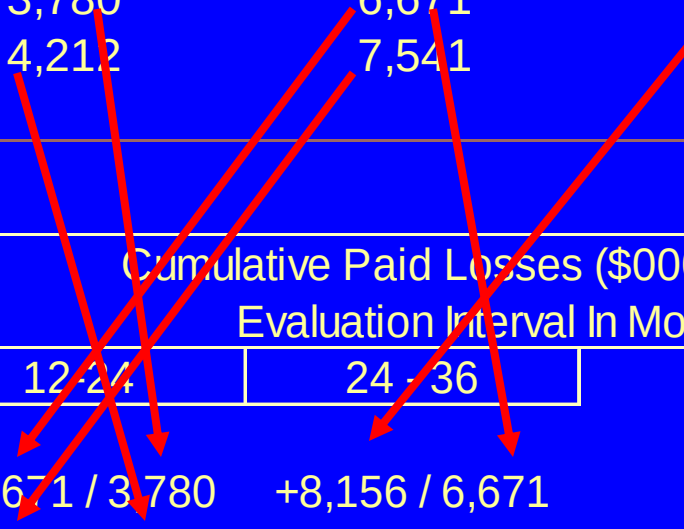
Sample Calculation for Accident Year 2004:			
12-to-24 Months	1.790	=	7,541 / 4,212

From the end of the accident year (at 12 months) to the end of the following year (at 24 months), paid losses for 2004 grew 79%. During the next year (from 24 to 36 months), paid losses experienced an additional 24% growth (or development) and so forth.

Basic Reserving Techniques:

Compilation of Paid Loss Triangle

Accident Year	Cumulative Paid Losses ($000 Omitted) Development Stage in Months		
	12	24	36
2003	3,780	6,671	8,156
2004	4,212	7,541	



Accident Year	Cumulative Paid Losses ($000 Omitted) Evaluation Interval In Months	
	12-24	24 - 36
2003	+6,671 / 3,780	+8,156 / 6,671
2004	+7,541 / 4,212	

Basic Reserving Techniques:

Compilation of Paid Loss Triangle

Accident Year	Cumulative Paid Losses ($000 Omitted) Evaluation Interval In Months	
	12-24	24 - 36
2003	+6,671 / 3,780	+8,156 / 6,671
2004	+7,541 / 4,212	

Accident Year	Evaluation Interval in Months		
	12-24	24-36	
2003	1.765	1.223	
2004	1.790		

Basic Reserving Techniques:
Paid Loss Development Factors

Loss Development Factors (LDFs) are also known as:

- Age-to-Age factors
- Link Ratios

Basic Reserving Techniques:

Paid Loss Development Factors

Accident Year	Evaluation Interval in Months					
	12-24	24-36	36-48	48-60	60-72	72 to Ultimate
2003	1.765	1.223	1.129	1.085	1.052	
2004	1.790	1.240	1.138	1.084		
2005	1.809	1.240	1.134			
2006	1.799	1.237				
2007	1.834					
2008						
Average - All Years	1.799	1.235	1.134	1.085	1.052	
Average - Latest 3 Years	1.814	1.239	1.134	XXX	XXX	
Average - Excl Hi & Lo	1.799	1.239	1.134	XXX	XXX	
Wt Average - All Years	1.803	1.235	1.134	1.085	1.052	
Selected LDF	1.800	1.235	1.134	1.085	1.052	1.070

Basic Reserving Techniques:

Application of Paid LDM

	Evaluation Interval in Months					
	12-24	24-36	36-48	48-60	60-72	72 to Ultimate
LDFs	1.800	1.235	1.134	1.085	1.052	1.070

Accident Year	Cumulative Paid Losses ($000 Omitted) Development Stage in Months						Final Total Cost
	12	24	36	48	60	72	
2003	3,780	6,671	8,256	9,205	9,990	10,508	11,244
2004	4,212	7,541	9,351	10,639	11,536	12,136	12,985
2005	4,901	8,864	10,987	12,458	13,517	14,220	15,215
2006	5,708	10,268	12,699	14,401	15,625	16,437	17,588
2007	6,093	11,172	13,797	15,646	16,976	17,859	19,109
2008	6,962	12,532	15,477	17,550	19,042	20,032	21,435

Sample Calculations for Accident Year 2008:

At 24 Months: 12,532 = 6,962 x 1.800

At 36 Months: 13,797 = 11,172 x 1.235

15,477 = 6,962 x 1.800 x 1.235

Basic Reserving Techniques:

Paid LDM Projections & Reserves

Loss Reserve Estimate @ 12/31/08 = $32.241 million

Accident Year	Actual Paid Losses 12/31/08	Selected LDFs	Cumulative Development Factors to Ultimate	Estimated Ultimate Losses [(2) x (4)]	Actual Paid Losses 12/31/08	Estimated Loss Reserves [(5) - (6)]
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2003	10,508	1.070	1.070	11,244	10,508	736
2004	11,536	1.052	1.126	12,985	11,536	1,449
2005	12,458	1.085	1.221	15,215	12,458	2,757
2006	12,699	1.134	1.385	17,588	12,699	4,889
2007	11,172	1.235	1.710	19,109	11,172	7,937
2008	6,962	1.800	3.079	21,435	6,962	14,473
Total	65,335			97,576	65,335	32,241

Basic Reserving Techniques:

Issues to Consider for Paid LDM

Issues to Consider	Examples
Have there been any changes which might make the older years irrelevant?	There are more motorcycle losses in the oldest year; Typical P&C no longer insures motorcycles.
Are the more recent years better predictors of the future?	Typical P&C has begun writing more business in state X.
Are there outlier points that need to be ignored or adjusted?	In one year, there were bad ice storms at the end of December. Late reporting caused unusually high development in the next year.

Basic Reserving Techniques:

Incurred Loss Triangle

Accident Year	Case Reserves ($000 Omitted) Development Stage in Months					
	12	24	36	48	60	72
2003	5,557	4,176	2,936	1,987	1,245	742
2004	6,328	4,664	3,200	2,051	1,189	
2005	6,974	4,968	3,251	1,955		
2006	7,635	5,274	3,367			
2007	8,376	5,604				
2008	9,599					

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Accident Year	Cumulative Paid Losses ($000 Omitted) Development Stage in Months					
	12	24	36	48	60	72
2003	3,780	6,671	8,156	9,205	9,990	10,508
2004	4,212	7,541	9,351	10,639	11,536	
2005	4,901	8,864	10,987	12,458		
2006	5,708	10,268	12,699			
2007	6,093	11,172				
2008	6,962					

Basic Reserving Techniques:
Incurred Loss Triangle

Accident Year	Cumulative Case Reported Losses ($000 Omitted) Development Stage in Months						Final Total Cost
	12	24	36	48	60	72	
2003	9,337	10,847	11,092	11,192	11,235	11,250	???
2004	10,540	12,205	12,551	12,690	12,725		???
2005	11,875	13,832	14,238	14,413			???
2006	13,343	15,542	16,066				???
2007	14,469	16,776					???
2008	16,561						???

Basic Reserving Techniques:

Selected Incurred LDFs

Accident Year	Evaluation Interval in Months					
	12-24	24-36	36-48	48-60	60-72	72 to Ultimate
2003	1.162	1.023	1.009	1.004	1.001	???
2004	1.158	1.028	1.011	1.003		
2005	1.165	1.029	1.012			
2006	1.165	1.034				
2007	1.159					
2008						
Average - All Years	1.162	1.029	1.011	1.004	1.001	
Average - Latest 3 Years	1.163	1.030	1.011	XXX	XXX	
Average - Excl Hi & Lo	1.162	1.029	1.011	XXX	XXX	
Wt Average - All Years	1.162	1.029	1.011	1.003	1.001	
Selected LDF	1.162	1.030	1.011	1.003	1.001	1.000
Cumulative LDF	1.215	1.045	1.015	1.004	1.001	1.000

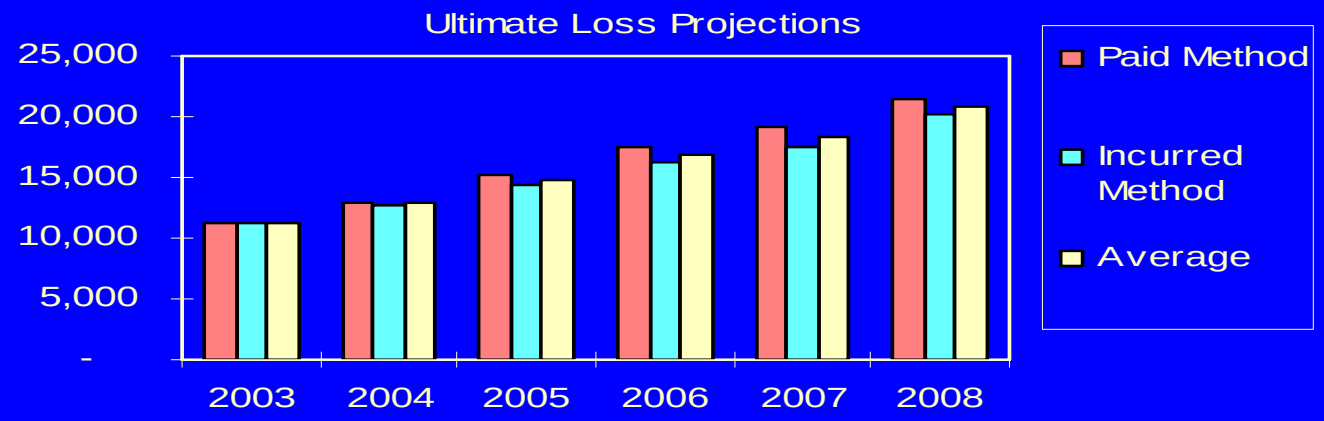
Basic Reserving Techniques:

Incurred LDM Projections & Reserves

Accident Year	Actual Reported Losses 12/31/08	Development Factors to Ultimate	Estimated Ultimate Losses [(2) x (3)]	Actual Paid Losses 12/31/08	Estimated Loss Reserves {(4) - (5)}
(1)	(2)	(3)	(4)	(5)	(6)
2003	11,250	1.000	11,250	10,508	742
2004	12,725	1.001	12,738	11,536	1,202
2005	14,413	1.004	14,471	12,458	2,013
2006	16,066	1.015	16,308	12,699	3,609
2007	16,776	1.045	17,539	11,172	6,367
2008	16,561	1.215	20,119	6,962	13,157
Total	87,791		92,425	65,335	27,090

Comparison of LDM Projections

Accident Year	Estimated Ultimate Losses Based on: Paid LDM	Incurred LDM	Average = Selected
	Paid Method	Incurred Method	Average
2003	11,244	11,250	11,247
2004	12,985	12,738	12,862
2005	15,215	14,471	14,843
2006	17,588	16,308	16,948
2007	19,109	17,539	18,324
2008	21,435	20,119	20,777
Total	97,576	92,425	95,001



Comparison of Loss Development Methods

Underlying Assumptions

- **PLDM: No changes in the payment pattern**
- **ILDM: No changes in case reserve adequacy**

Pro	Con
PLDM: "Hard" data; no estimates involved	PLDM: May generate large, volatile loss development factors & take longer to develop to ultimate
ILDM: Uses all available information	ILDM: Uses case reserves, which are estimates, to develop estimates of ultimate losses

Key Assumptions & Potential Problems

Assumptions	Potential Problems
Claims settlement patterns unchanging	Increasing delays in claim closing rates
Case reserving practices & philosophies unchanging	Conscious effort to improve case reserve adequacy; Introduction of new case reserving procedures
No claim processing changes	Change in data processing; Revised claim payment recording procedures
Policy limits have no impact on loss development	Increasing frequency of full policy limits claims; Changing policy limits

Key Assumptions & Potential Problems

Assumptions	Potential Problems
Loss development unaffected by changing loss cost trends	Surges in inflation; Increased litigation; Diminished policy defenses
No change in mix of business	Changes in reinsurance coverages; Increased long-tail exposures; Introduction of new or revised coverages
No cyclical loss development	Underwriting cycles impact claims settlement or reserving practices

Key Assumptions & Potential Problems

Assumptions	Potential Problems
No data anomalies	Catastrophic or unusual losses reflected in loss experience; Unusual claim settlement/reporting delays

Comparison of Estimated Reserves

Accident Year	Estimated Loss Reserves Based on:		
	Paid LDM	Incurred LDM	Average = Selected
	Paid Method	Incurred Method	Average
2003	736	742	739
2004	1,449	1,202	1,326
2005	2,757	2,013	2,385
2006	4,889	3,609	4,249
2007	7,937	6,367	7,152
2008	14,473	13,157	13,815
Total	32,241	27,090	29,666

Comparison of Estimated Reserves

Comparison of Estimated Reserves

- Which estimate is right?
- Which estimate is best?
- How will you know?
- When will you know?

Session I Review

- CAS Statement of Principles
  - Definitions
  - Principles
  - Considerations
- Basic Reserving Techniques
  - Paid Loss Development Method (PLDM)
  - Incurred Loss Development Method (ILDM)

Looking Ahead

- Evaluating for Reasonability
- Factors influencing Sensitivity of Estimates
- More Basic Reserving Techniques
- Loss Adjustment Expenses
- Schedule P
- Examples - You set the reserve!

Basic Track I

2009 CLRS

September 2009

Chicago, IL