

## Using Statistical Modeling to Update Table M

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 Session Number R - 8  
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## Overview

- Creating an Aggregate Loss Distribution
  - Aggregate Loss Factors (ALFs) On Demand
  - Project Scope
  - Determine Methodology to Create Aggregate Loss Distribution and Corresponding Aggregate Excess Loss Factor (AELF) Table
  - Combining Multiple Segments
  - Discretizing the Severity Distribution
  - Determining the Claim Count Distribution

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## ALFs On Demand

- In order to determine the expected loss for a loss sensitive policy, such as a retrospective rated policy, the loss distribution is needed. The more accurate the estimate of the loss distribution; the better the estimate of the expected losses for the loss sensitive policy
- NCCI has developed ALFs On Demand for this purpose
  - ALFs on Demand creates an aggregate distribution in real time based on the specific policy characteristics
    - Expected loss by state and hazard group, where each state / hazard group combination has a underlying severity distribution based upon filed Excess Loss Factor (ELF) methodology
    - Per claim or per occurrence loss limitation
  - From the aggregate loss distribution the expected loss is calculated:
    - Above the per claim / occurrence limit
    - Below the minimum loss amount
    - Above the maximum loss amount

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## Project Scope – Policy

- Create an aggregate loss distribution based on a retrospective rated workers compensation policy

### Policy Information

Description  
ABC Construction

Effective Date  
1/1/2019

### Segments

State A  
State B

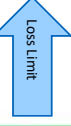
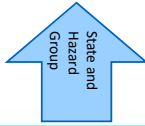
Hazard Group B  
Hazard Group D

\$500,000

\$250,000

\$5,000,000

\$5,000,000



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## Project Scope - Requirements

- Aggregate Excess Loss Factor values precise to 4 decimal places at interval sizes equal to 1/100<sup>th</sup> of limited expected loss
- Aggregate loss distribution calculated up to 10x the aggregate limited expected loss

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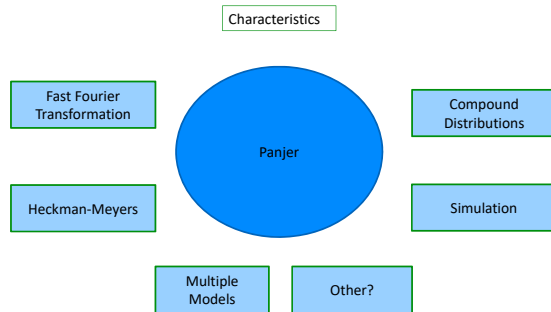
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## Choose a Model - Discussion



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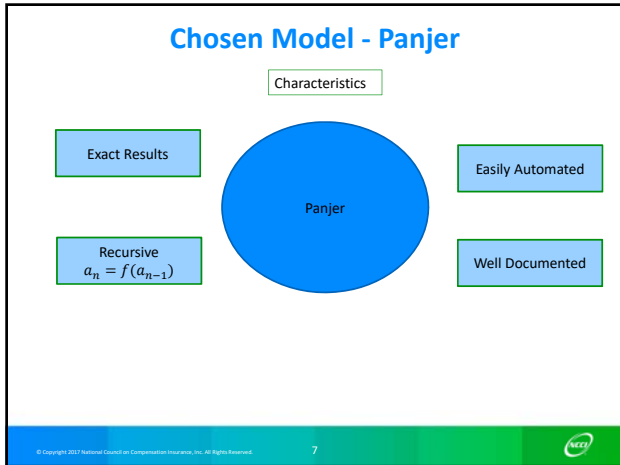
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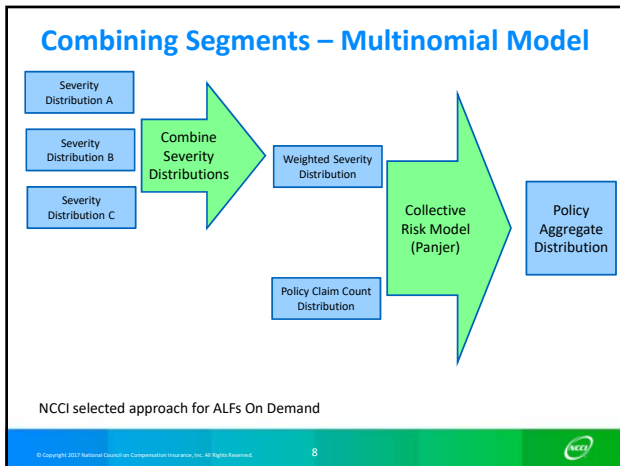
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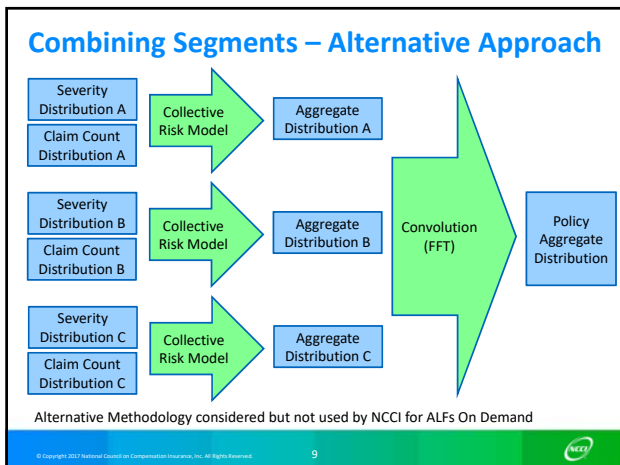
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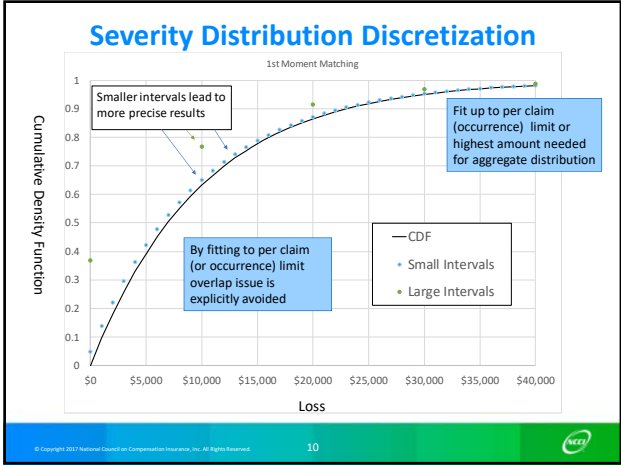
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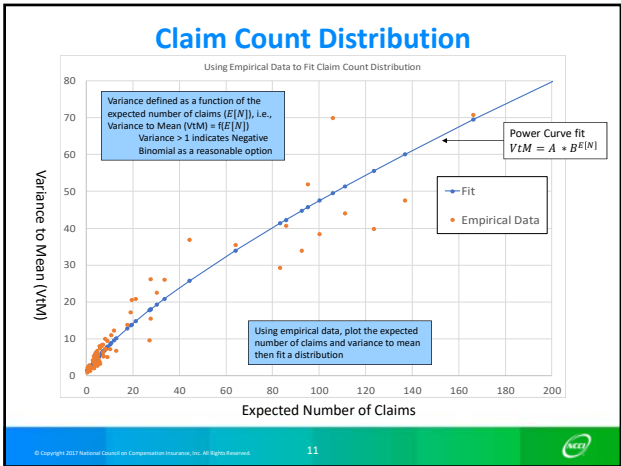
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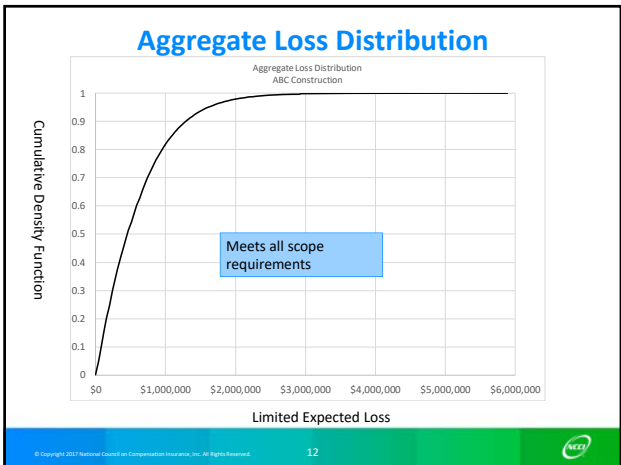
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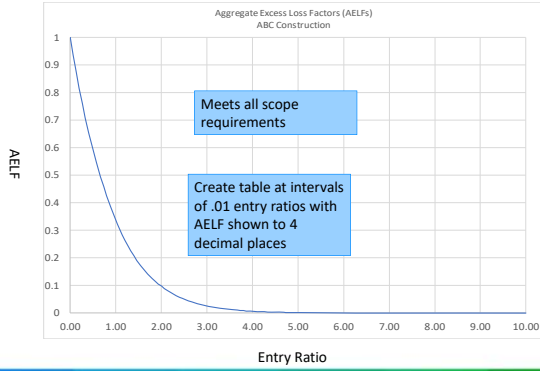
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## Aggregate Excess Loss Factors (AELFs)



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## Summary

- Scope of Project
- Determine Methodology to Create Aggregate Loss Distribution
  - Panjer
- Multinomial Model
- Discretize Severity Distribution
  - Interval Size
  - Limit Severity Distribution
- Claim Count Distribution
  - Empirical Data Analysis
  - Variance to mean (VtM) as a Function of Expected Number of Claims ( $E[N]$ )
    - $VtM = A + B^{E[N]}$



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