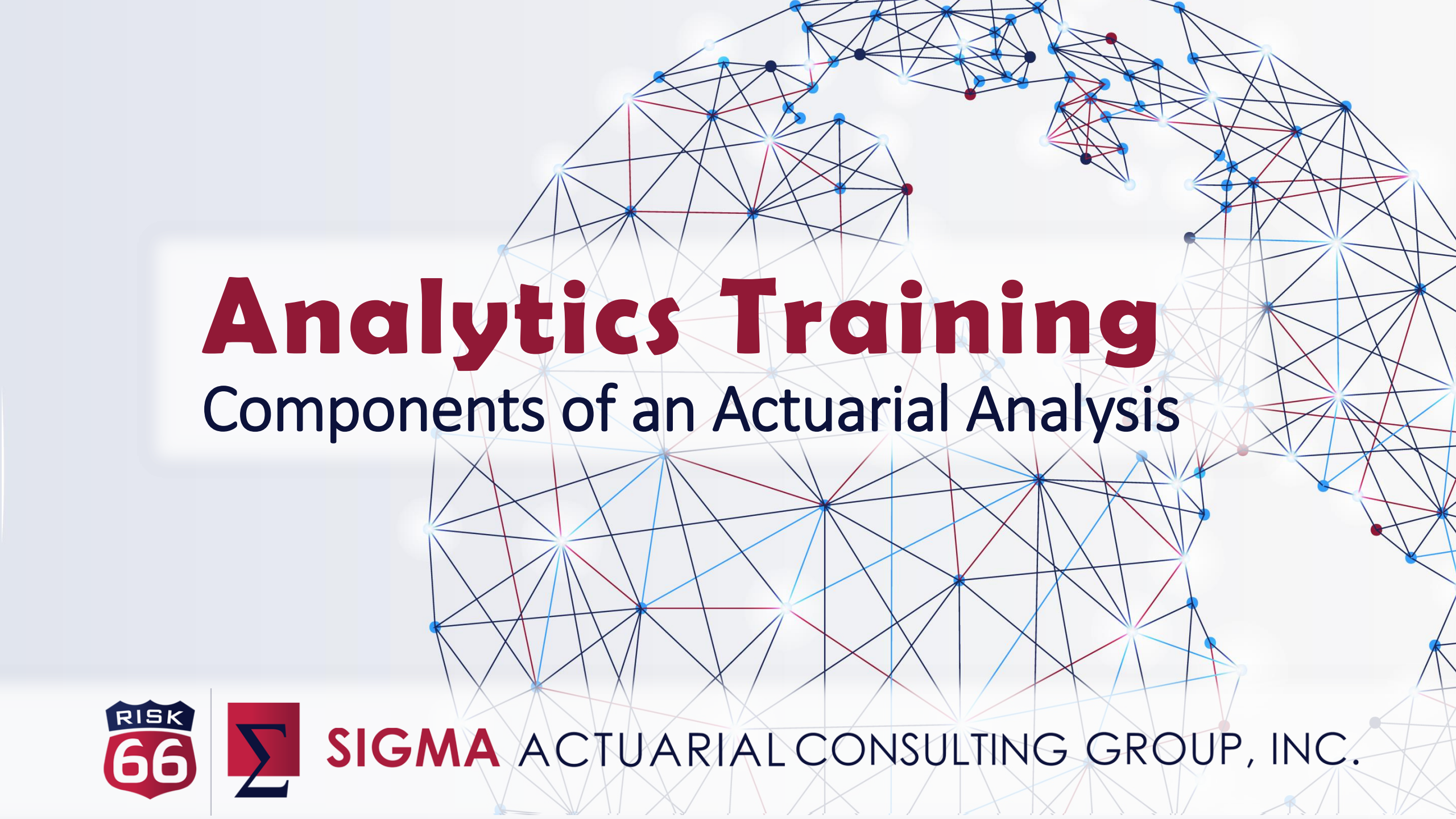

Analytics Training

Components of an Actuarial Analysis

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Meet the Trainers:

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Why are actuaries or actuarial analytics necessary?

Actuaries

synthesize their knowledge of statistics, finance, and insurance to help businesses or organizations accurately assess the cost of a certain type of risk.

Actuarial Analytics

use the law of large numbers to create credible assessments which contemplate a business or organization's unique industry, line(s) of coverage, and geographical location.

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Key components of an actuarial analysis

Loss projections calculate expected loss amounts for an upcoming policy period.

This type of calculation can be used for:

Key components of an actuarial analysis

Reserve analyses calculate an estimate of required reserves for losses that have already occurred as of a certain date.

Commonly referred to as the **Evaluation Date**

This type of calculation can be used for:

Regulatory Requirements	Funding for Budgetary Purposes	Collateral Negotiation

Development Triangles

What do they measure?

- Incurred Losses
- Paid Losses
- Claim Count

Development Triangles

How do I interpret them?

Loss development triangles measure changes (or development) in each policy period's losses over consistent intervals of time.

Annual Intervals
are commonly used

By comparing these changes, actuaries calculate age-to-age factors, which are numerical values displaying the actual percentile changes over time.

Development Triangles

Why are they needed?

Loss development triangles ultimately produce loss development factors, which are used in an actuarial analysis to estimate future development

While numerous ways of estimating future development area available, loss development factors typically serve as the bedrock of an actuarial analysis.

Development Triangles

When do I need them?

Unique Triangles	Industry Benchmark Triangles (and LDFs)
used when history is available and credible. They measure an organization's unique loss development history and are almost always preferred.	are used in lieu of unique triangles. These are specific to coverages and potentially to geographic locations.

Using this Knowledge: ABC Corp

Due to their size and the value they place on data retention, ABC Corp already has loss development triangles.

These could prove to be very useful when negotiating with their carrier, as the carrier has been slow to recognize the recent safety improvements ABC Corp has implemented.

Luckily, these improvements are reflected analytically in their unique loss development triangles.

Using this Knowledge: XYZ, Inc.

XYZ, Inc has never created unique loss development triangles, but they have data available to do so.

By creating triangles for XYZ, Inc, you can start to blend industry benchmarks with their loss development history.

This will help ensure their loss projections and reserve analyses reflect their unique loss experience.

Ultimate Loss Estimates

Development Methods

Using these methods, LDFs are applied to all losses in a policy period based on its age and the type of loss.

Incurred Method Example:

Company	Period Start	Period End	Evaluation Date	Limited Incurred Losses	Age in Months	Incurred LDF	Ultimate Loss Estimate
ABC Corp	01/01/20	12/31/20	12/31/20	$385,000	12	1.929	$742,665

Paid Method Example:

Company	Period Start	Period End	Evaluation Date	Limited Paid Losses	Age in Months	Paid LDF	Ultimate Loss Estimate
XYZ, Inc.	01/01/20	12/31/20	12/31/20	$42,000	12	4.957	$208,194

Ultimate Loss Estimates

Issues/Considerations

The **INCURRED** Method

relies on future reserving philosophy matching historical philosophy.

The **PAID** Method

relies on future payment patterns/schedules matching historical patterns/schedules.

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Ultimate Loss Estimates

Which to Choose?

1

The development methods are typically used in conjunction with each other to balance out each other's potential issues.

2

In most cases, it's recommended that those without significant experience in actuarial science rely on a 50/50 weighted average of the two methods.

3

However, in very specific cases, adjusting the weighting may be necessary.

Ultimate Loss Estimates

Using this Knowledge – ABC Corp

ABC Corp's recent changes mean their losses no longer have large reserve changes in the earlier periods.

Since their incurred loss development factors don't reflect this yet, you decide to rely more heavily on the paid method.

Period Start	Estimated Ultimate Losses (Incurred Method)	Estimated Ultimate Losses (Paid Method)	Selected Estimated Ultimate Losses	Weighting
01/01/19	$593,918	$482,142	$540,000	50% Inc / 50% Paid
01/01/20	742,665	530,399	640,000	50% Inc / 50% Paid
01/01/19	$593,918	$482,142	$510,000	25% Inc / 75% Paid
01/01/20	742,665	530,399	580,000	25% Inc / 75% Paid

Ultimate Loss Estimates

Other Common Methods

Case Development » Loss Projection

Bornhuetter-Ferguson » Frequency-Severity

Common Terminology

Exposure

Exposures are numerical values indicating an organization's **exposure to risk** in a specific coverage and policy period.

XYZ, Inc.	
Period Start	**Exposure (Payroll)**
01/01/15	$6,100,000
01/01/16	6,800,000
01/01/17	7,200,000
01/01/18	7,400,000
01/01/19	7,700,000
01/01/20	8,000,000

Common Terminology

Pure Loss Rate

Pure loss rates are a measure of an organization's **loss experience** in a policy period as compared to their exposure in that same period.

By examining these, we can better identify trends in their program history.

ABC Corp.

Period Start	Pure Loss Rate (Per $100 Trended Payroll)
01/01/15	$1.18
01/01/16	1.13
01/01/17	0.98
01/01/18	0.99
01/01/19	0.73
01/01/20	0.85

Common Terminology

Trend Factors

Trend Factors

are numerical values reflecting inflationary, medical, and judicial changes over time.

They are applied to historical losses to ensure they are analyzed on a consistent monetary basis.

Common Terminology

Retention/Limit/Deductible

1

These amounts indicate the point at which a primary insurer or reinsurer are responsible for losses (and/or expenses)

2

Common policies are "Per Occurrence," which contemplate individual occurrences within a policy period and "Aggregate," which contemplate the total loss amount in a policy period.

3

Any loss amounts exceeding these are referred as "Excess Losses."

Common Terminology

Estimated Required Reserves

This amount is an indication of the total funding needed to cover all claims occurring within a specific period of a program's history.

Estimated required reserves include:

CASE RESERVES	IBNR
the reserves currently set aside by claims adjusters to cover each claim	includes additional development on known claims and claims which have occurred but not yet been reported

Takeaways

Ultimate loss estimates are the core of almost any actuarial report, even if they aren't typically the "end goal."

Knowing what to select, when to deviate from the norm, and when to make significant adjustments takes time and experience.

This is part of why actuaries are so necessary

Next Session:

Review of Loss Sensitive Rating Plans

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