



International Fire Instructors Workshop 2026

A black and white photograph of a firefighter in full gear, including a helmet with a 'PZMAT' label and a communication system. The firefighter is looking off to the side with a focused expression. In the background, another firefighter's hand is visible, holding a piece of equipment.

Fireground Sensemaking and Decision Making for the Station Officer

Command Skills Continuous Improvement



Chief Ed Hartin, MS, EFO, FIFireE, CFO

Experience

- Career Firefighter and Officer (1974-2025)
- 32 Years as a Chief Officer

Focus

- Fire dynamics, strategy, tactics, and command
- Ongoing research on station officer anticipation and sensemaking

Publications and Training

- Co-author *3D Firefighting*
- 600+ Tactical Decision Games
- International instructional delivery

Professional Service

Past president, USA Branch-Institution of Fire Engineers





Overview

- How do station officers make sense of structure fires during response and after arrival at structure fires?
- How might pre-arrival anticipation and planning influence station officers' initial fireground decision making?
- What leverage points might improve station officers' decision making effectiveness?

You are responding to a
House Fire

*What are the first things that come to your mind?
What decisions will you need to make?*



Critical Questions



- How do station officers make sense of an incident before they ever step off the pump?
- What cues do we notice first, and which do we miss?
- How do early assumptions shape our initial strategy and risk tolerance?
- When (and how) do we recognize that our initial understanding is wrong?

Experience & Expertise

How many fires?

What was your role?

What did you learn?

How much do you remember?

Can you apply it in context?

Experts demonstrate superior performance on a specified set of representative tasks for a domain.

How much experience do you really have?

Do you have expertise as a fireground commander?



Types of Knowledge

- **Declarative Knowledge:** Knowing what.
- **Procedural Knowledge:** Knowing how.

- **Tacit Knowledge:** A web of intuitive and experiential insights.

Recognizing the pattern of changing conditions and anticipating potential for flashover is an application of tacit knowledge (rather than a thoughtful analysis of the reasons for increasing smoke velocity, lowering neutral plane, and darkening smoke color).



Routine vs Adaptive Expertise

Adaptive expertise requires depth of knowledge.



- Personal experience.
- Directed experience (apprenticeship).
- Manufactured experience (simulation).
- Vicarious experience (stories).



Sensemaking

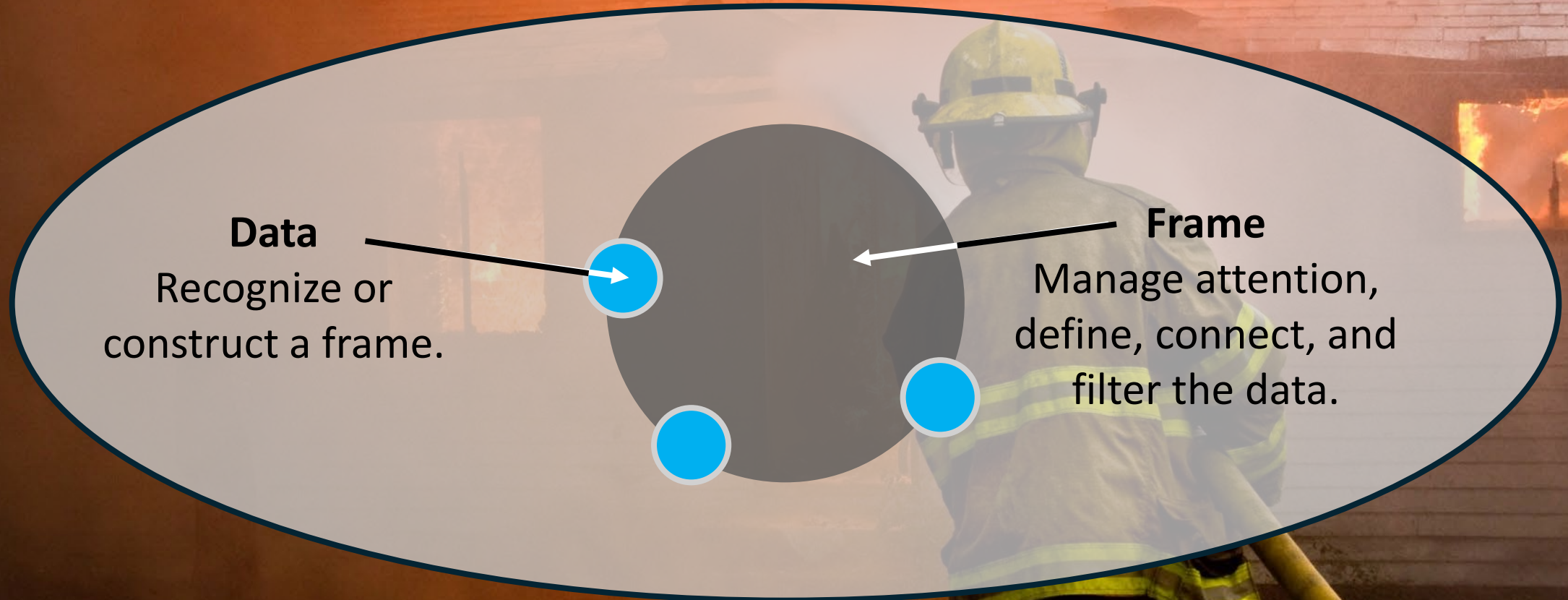


- The concept of sensemaking is well named because, literally it means the making of sense (Karl Weick)
- Sensemaking is the way that people interpret and give meaning to their experiences.
- It is an effort to answer the questions “what’s going on?” and “what should I do”?

Responding to and operating at fires, station officers make sense with limited, ambiguous, and dynamic information.



Sense Making-Data Frame Theory



Gary Klein, Brian Moon, & Robert Hoffman

Making Sense of Sensemaking 2: A Macrocognitive Model (2006)





Multiple Frames





Anticipation and Planning

- Is this situation typical?
- What do I expect to find?
- What cues are relevant in this situation?
- What goals are plausible?
- What actions might I need to take?

More on this in a bit...

Naturalistic Decision-Making



- A field of study examining how people make decisions in real-world situations.
- Focuses on how people use their experience and intuition to make decisions in complex, uncertain, and high-stakes environments.

Early NDM work focused on fireground command decision-making

Expert and Novice Fireground Command Decisions (Calderwood, Crandall, & Klein, 1987)

Rapid Decision making on the fireground (Klein, Calderwood, & Clinton-Cirocco, 1988)



What is a Decision?

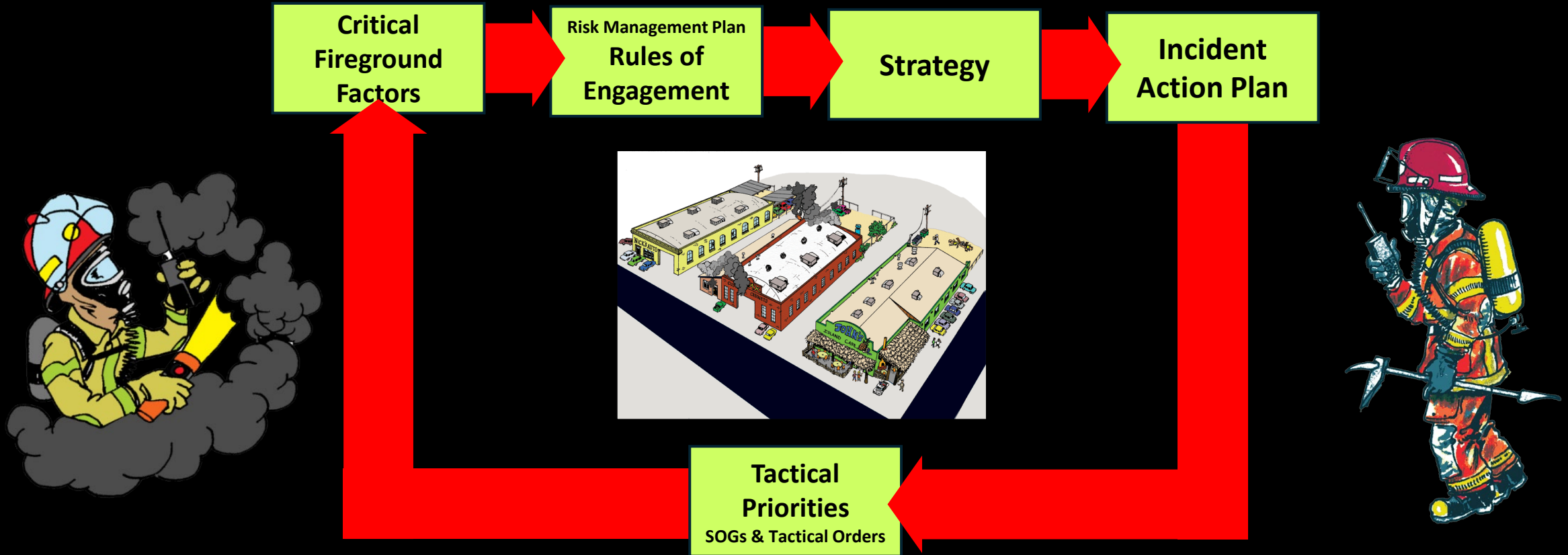


- Comparing two or more options and making a choice.
- Choosing without comparison.

Novices vs. Experts



Strategic Decision-Making Model



Declarative and Process (But Not Tacit) Knowledge



Critical Factors

Fixed Factors

- Building
- Occupancy
- Arrangement

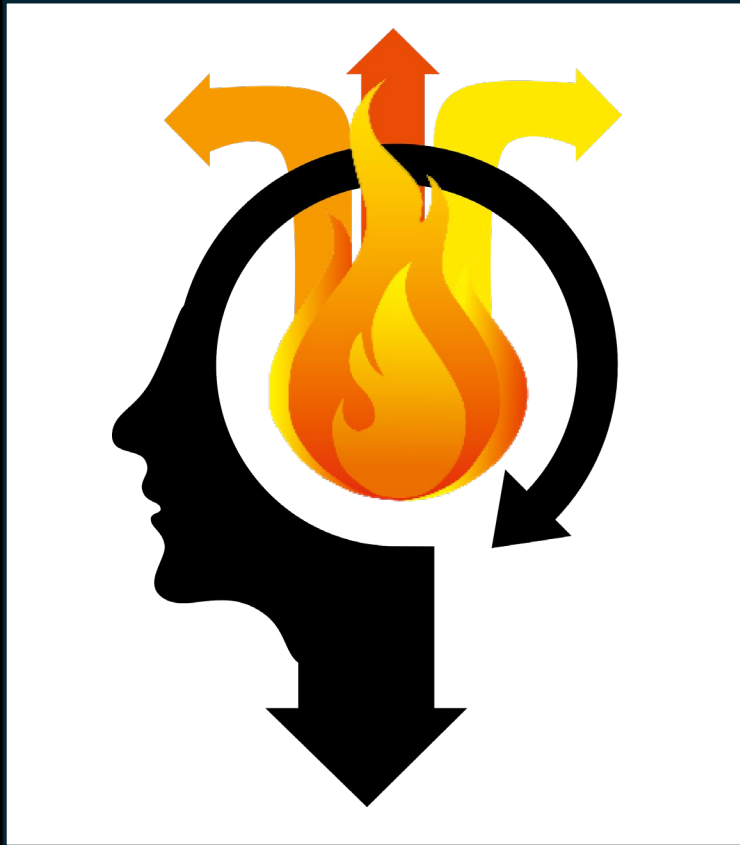
Variable Factors

- Fire
- Life Hazard
- Impact of Action
- Special Circumstances
- Resources

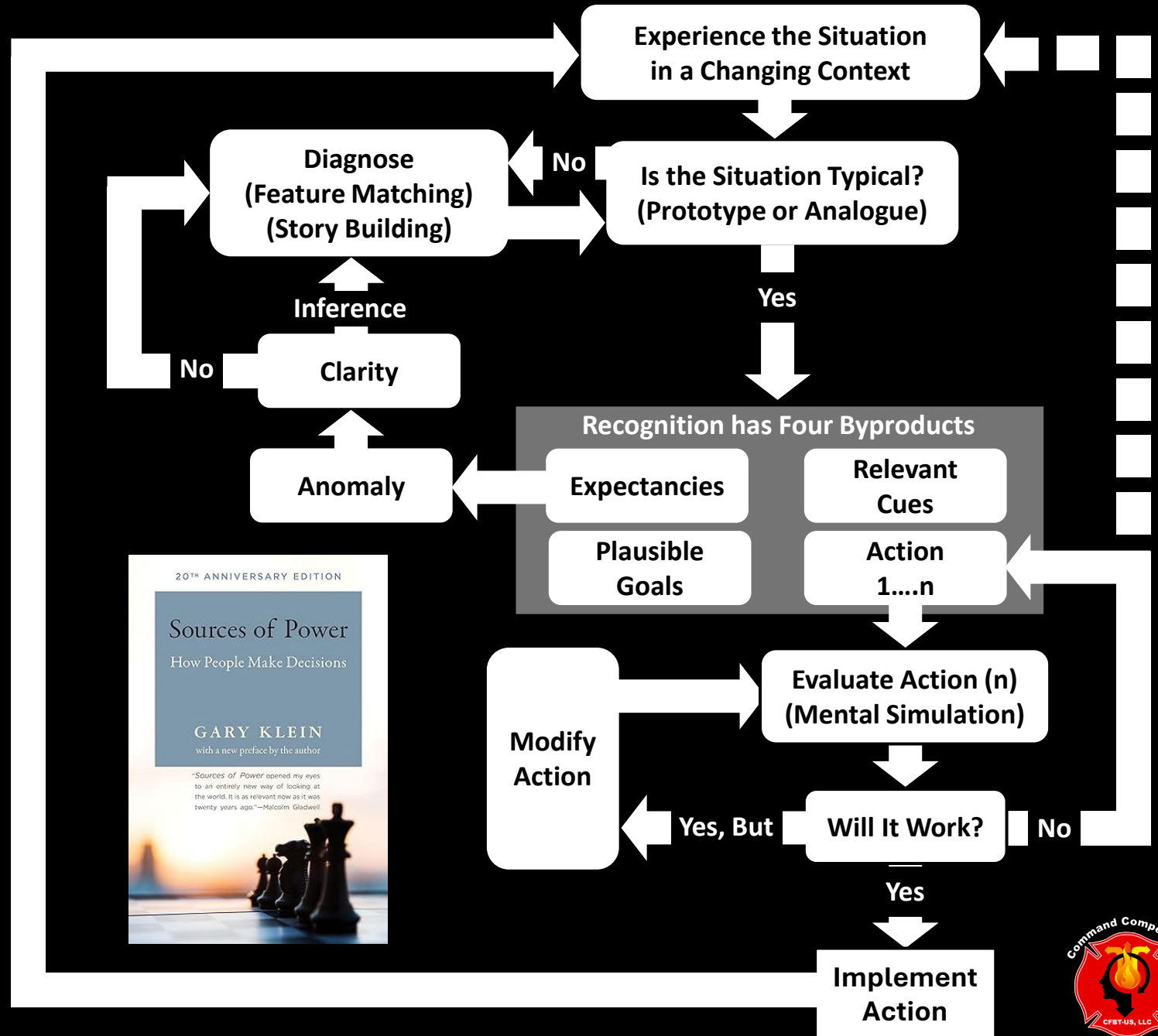
There are a multitude of fireground factors that may be critical, but attempting to think about all of them quickly overloads your working memory!



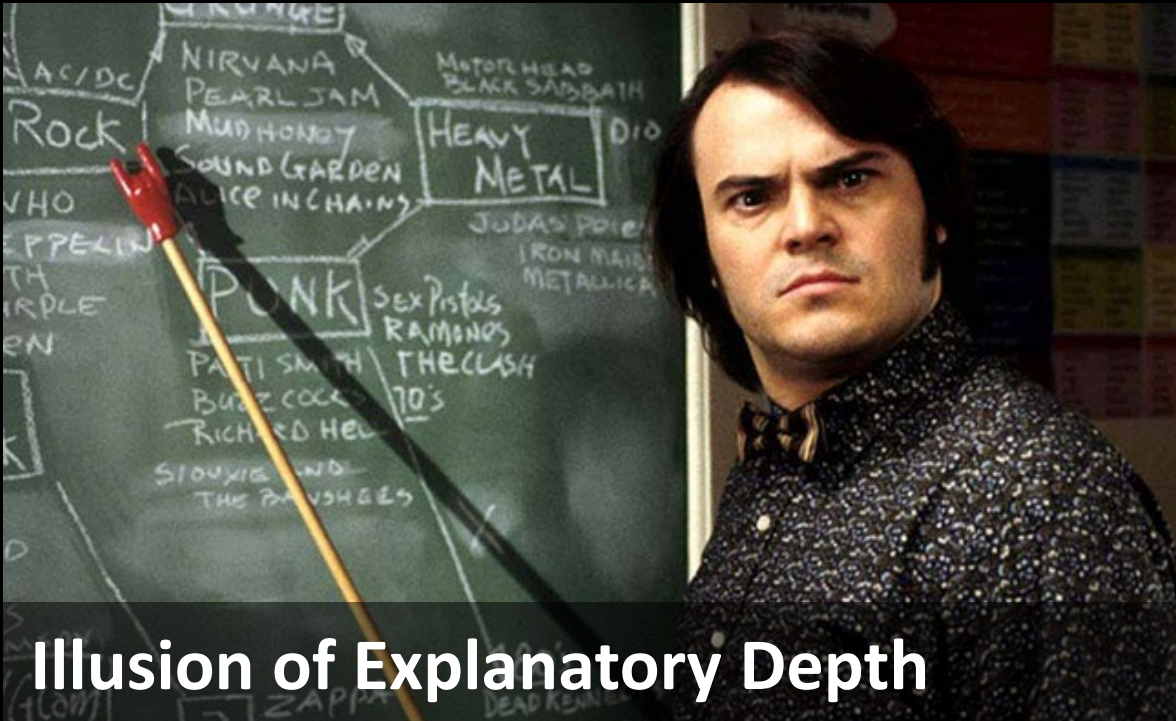
RPD is a Cyclical Process



Learning about the model explains how and why but does not make you a better decision-maker!



Challenges to Effective Incident Command



Illusion of Explanatory Depth

You probably **don't know** as much as **you think** you do.

- What is the impact on sensemaking and decision making on the fireground?
- What can we do about it?

We can't implement effective tactics when we don't understand the fire environment and the effect of our operations.



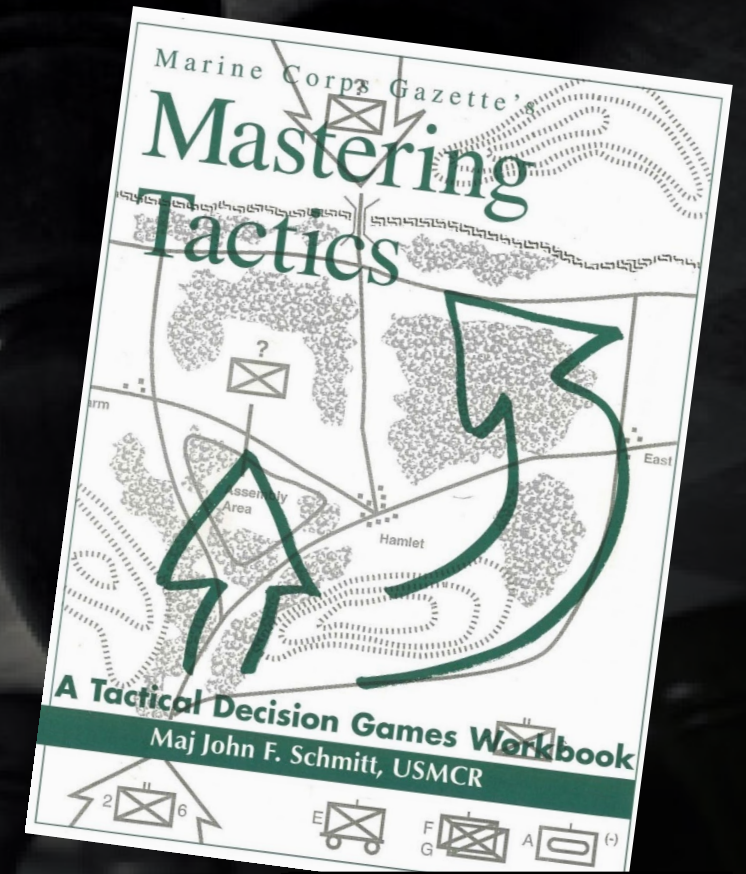
ICs Require

- An effective mindset, attitude, and aptitude.
- Well developed job knowledge and experience.
- Effective incident management skills.
- Leadership rooted in credibility and competence.



Developing Expertise

- **Practice:** Concentrate deeply on applying a variety of strategies to improve performance incrementally.
- **Feedback:** Seek feedback after completing tasks to assess accuracy and understand outcomes.
- **Analysis:** Study past performance, your own and experts', to analyze what worked, why, and areas for improvement.
- **Modify:** Adjust tasks, problems, or strategies in subsequent practice sessions based on your analysis and feedback to enhance skill development.



Pre-Arrival Thinking

Why study station officers' pre-arrival thinking?



The first arriving station officer establishes:

- Initial frame
- Strategy risk posture
- Tempo of the incident

Yet most training focuses on:

- Command mechanics
- Strategy & tactics
- Not cognition



Research Design

Participants

Station officers who were the IC at a recent working structure fire.

Methods

- Cognitive interviews.
- Focus on pre-arrival and early command of incident operations.

Focus

- Anticipation.
- Cue Selection.
- Framing & frame handling.
- Pre-arrival anticipation and planning.
- Early incident action plan.



Preliminary Observations



- Frame of reference is identified based on a limited number of cues.
- Sometimes, the initial frame does not match later information or what is found on arrival.
- The initial frame can help identify anomalies (something does not match).

What is Size-Up?



Consider Fixed & Manage Variable Factors

Fixed Factors

- Building
- Occupancy
- Arrangement

Variable Factors

- Fire
- Life Hazard
- Resources
- Action
- Special Circumstances



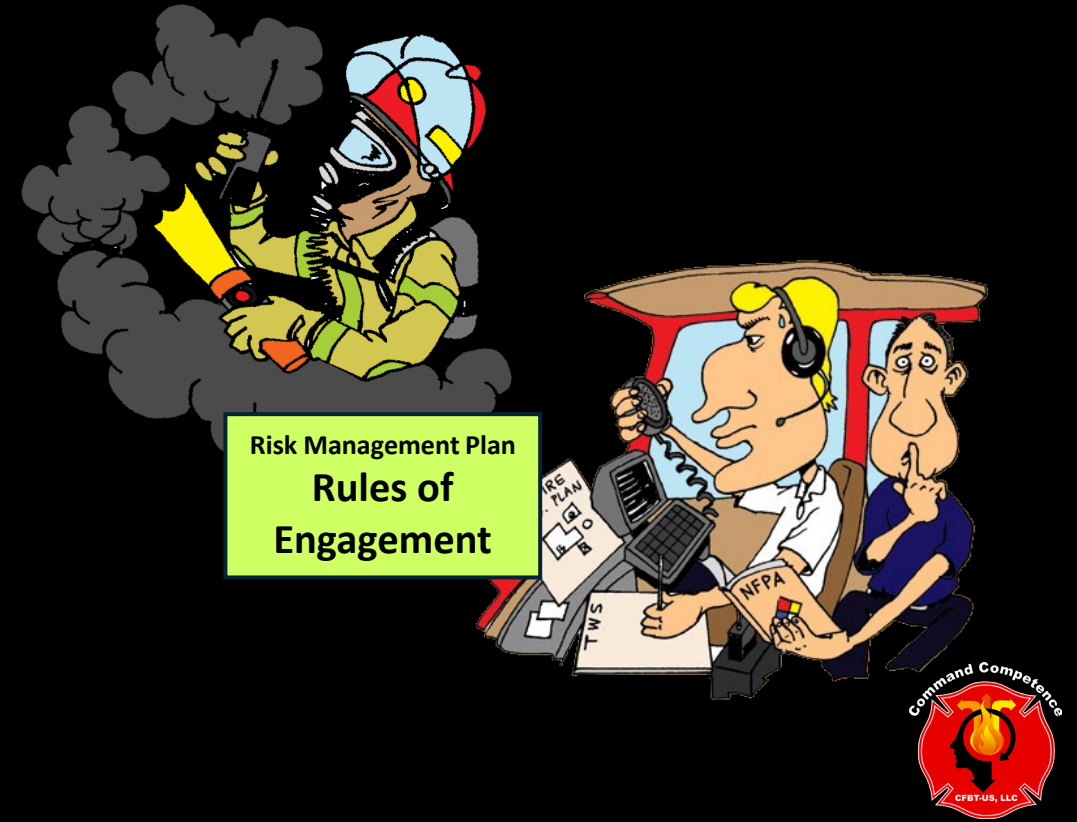
Size-Up Starts with 3 Questions

1. What's the problem?

2. What's in the way of achieving the tactical objectives?

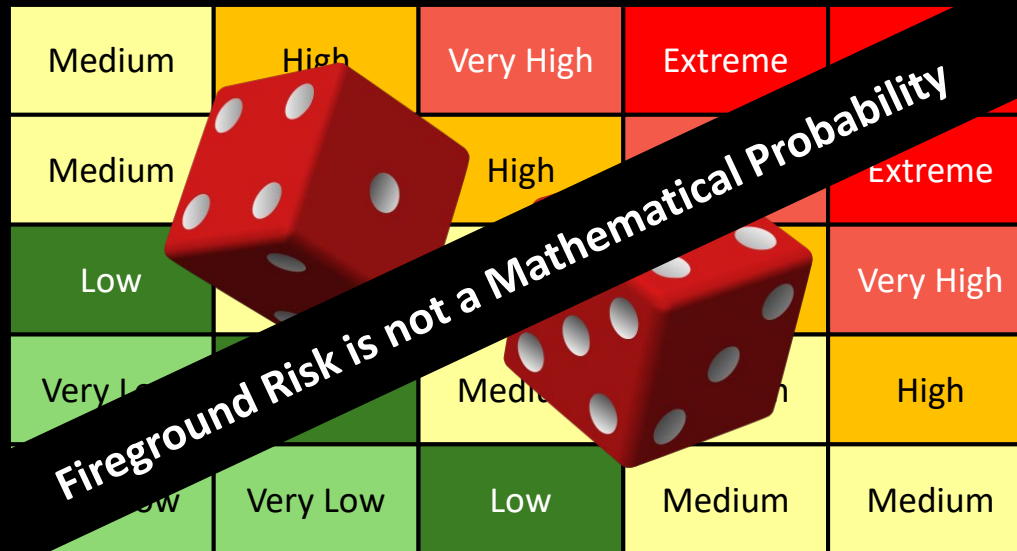
- *Fire Control*
- *All Clear*
- *Loss Stopped*

3. What can hurt or kill me?



Risk Management is about the Why!

A **hazard** is anything that could cause harm.



The image shows a 5x5 risk matrix with a diagonal banner that reads "Fireground Risk is not a Mathematical Probability". Two red dice are placed over the matrix. The matrix cells contain risk levels: Medium, High, Very High, Extreme, and Very Low. The colors of the cells range from green (low risk) to red (high risk).

Medium	High	Very High	Extreme	Extreme
Medium	High	High	High	Extreme
Low	High	High	High	Very High
Very Low	High	Medium	High	High
Very Low	Very Low	Low	Medium	Medium

Risk is a combination of probability and severity of harm from a hazard.

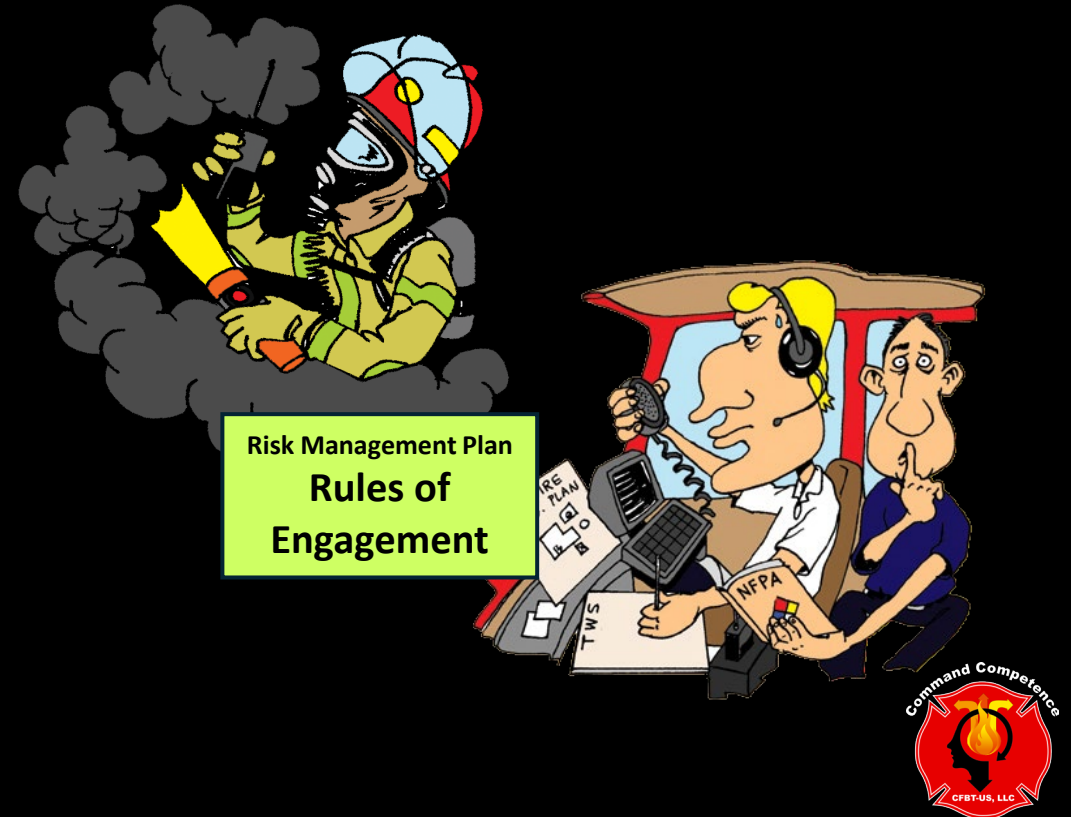
We operate in a deliberate and calculated manner!

- **We will not risk the lives of our members for lives or property that is already lost.**
- **We will accept limited risk to save savable property.**
- **We will accept a greater level of risk to protect savable lives.**



Is there a Safety Problem?

1. Is it reasonable to believe that the building is occupied?
2. Can I recognize searchable space?
3. Can I do something about it?





“This is about managing real work
and doing it over and over again!”

DC Chris Stewart





Questions?

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