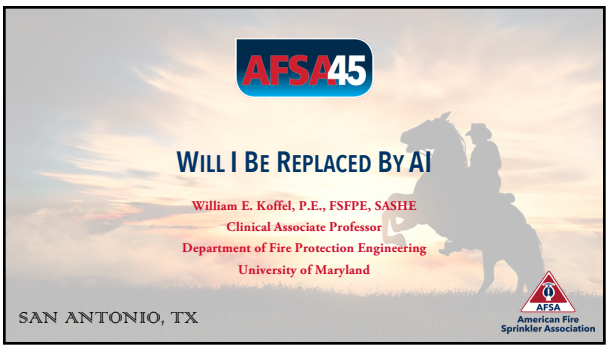
AFSA45
WILL I BE REPLACED BY AI
William E. Koffel, P.E., FSFPE, SASHE
Clinical Associate Professor
Department of Fire Protection Engineering
University of Maryland
SAN ANTONIO, TX
AFSA
American Fire Sprinkler Association

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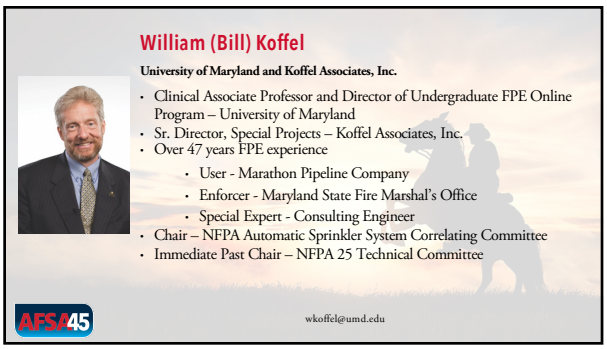
William (Bill) Koffel
University of Maryland and Koffel Associates, Inc.
Clinical Associate Professor and Director of Undergraduate FPE Online Program – University of Maryland
Sr. Director, Special Projects – Koffel Associates, Inc.
Over 47 years FPE experience
User - Marathon Pipeline Company
Enforcer - Maryland State Fire Marshal's Office
Special Expert - Consulting Engineer
Chair – NFPA Automatic Sprinkler System Correlating Committee
Immediate Past Chair – NFPA 25 Technical Committee
AFSA45
wkoffel@umd.edu

2

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1) scan badge upon entry,
2) attend seminar in its entirety, and,
3) submit evaluation within 14 days
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National Fire Protection Association
The authority on fire, electrical, and building safety
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Any opinion expressed is the personal opinion of the author and presenter and does not necessarily present the official position of the NFPA and its Technical Committees.
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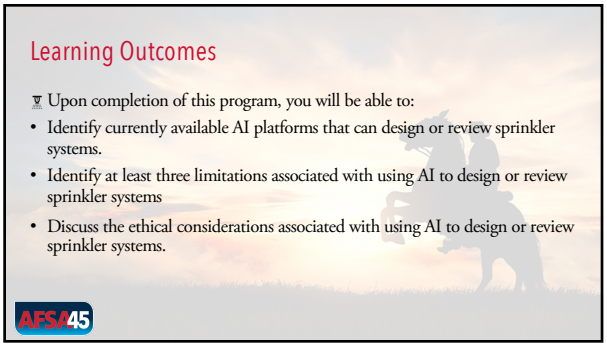
Learning Outcomes
Upon completion of this program, you will be able to:
Identify currently available AI platforms that can design or review sprinkler systems.
Identify at least three limitations associated with using AI to design or review sprinkler systems
Discuss the ethical considerations associated with using AI to design or review sprinkler systems.
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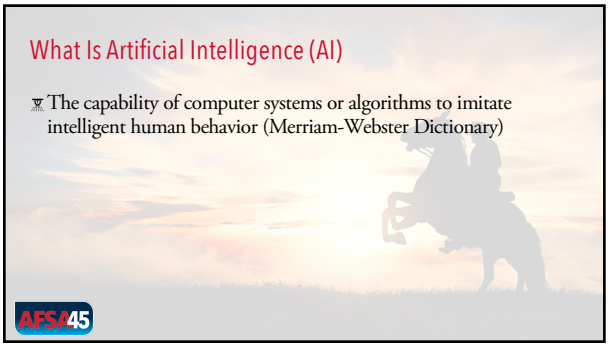
What Is Artificial Intelligence (AI)
The capability of computer systems or algorithms to imitate intelligent human behavior (Merriam-Webster Dictionary)
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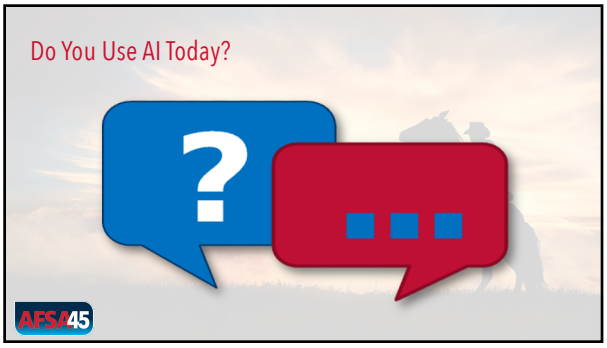
Do You Use AI Today?
?
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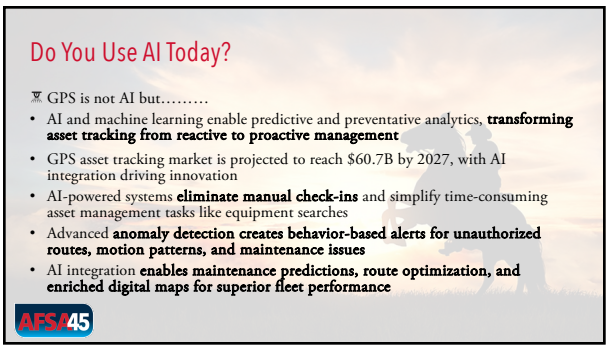
Do You Use AI Today?
GPS is not AI but……
AI and machine learning enable predictive and preventative analytics, transforming asset tracking from reactive to proactive management
GPS asset tracking market is projected to reach $60.7B by 2027, with AI integration driving innovation
AI-powered systems eliminate manual check-ins and simplify time-consuming asset management tasks like equipment searches
Advanced anomaly detection creates behavior-based alerts for unauthorized routes, motion patterns, and maintenance issues
AI integration enables maintenance predictions, route optimization, and enriched digital maps for superior fleet performance
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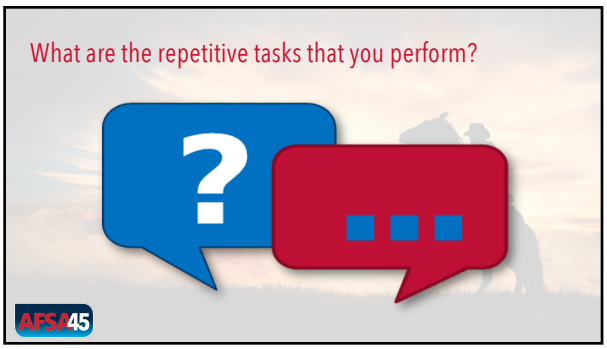
What are the repetitive tasks that you perform?
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8

If you had more time in the workday, how could you use that time?
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9

What does AI think it can do that you are currently doing?
Disclaimer:
The content you are about to see on the next 13 slides is for illustrative purposes only and the information has not be verified by the presenter
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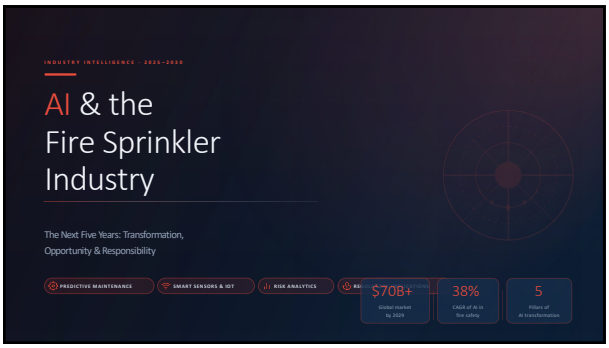
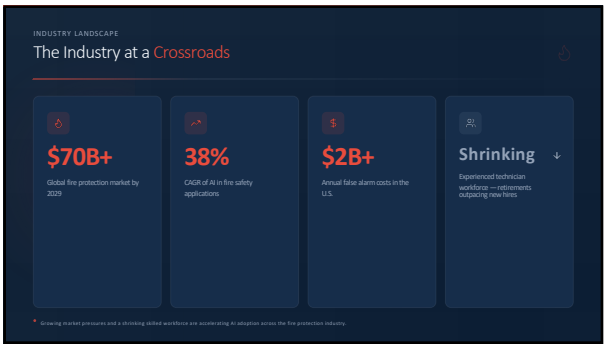
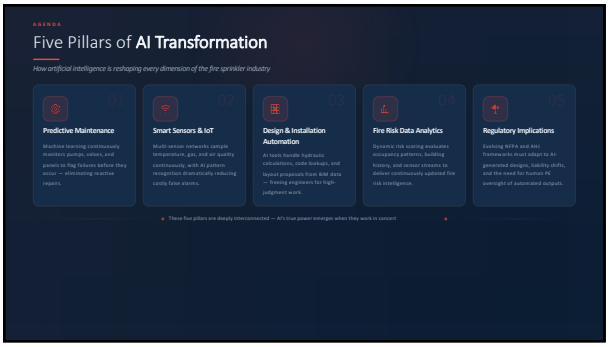

AI & the Fire Sprinkler Industry
The Next Five Years: Transformation, Opportunity & Responsibility
PREDICTIVE MAINTENANCE
SMART SENSORS & IOT
RISK ANALYTICS
$70B+
38%
5

11


INDUSTRY LANDSCAPE
The Industry at a Crossroads
$70B+
Global fire protection market by 2029
38%
CAGR of AI in fire safety applications
$2B+
Annual false alarm costs in the U.S.
Shrinking
Experienced technician workforce — retirements outpacing new hires

12



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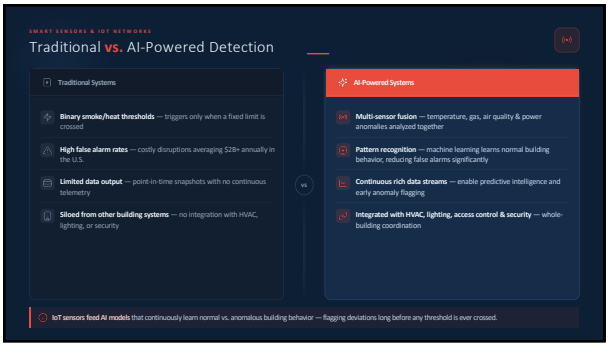

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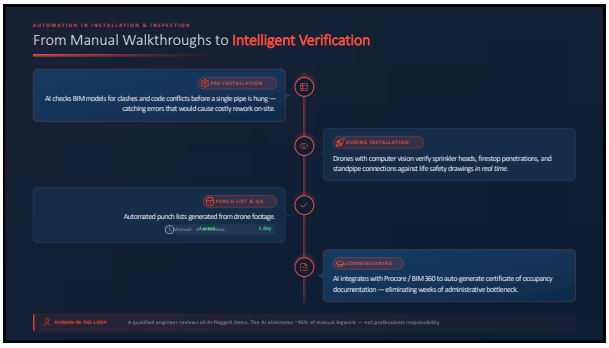

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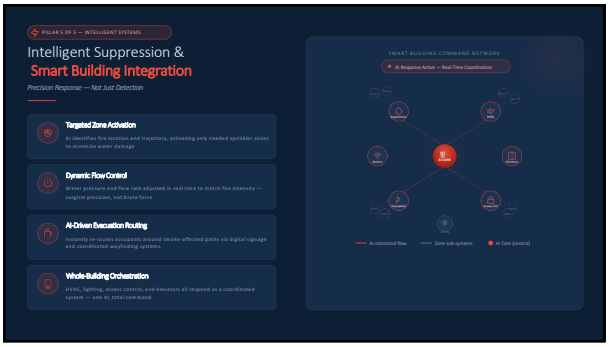

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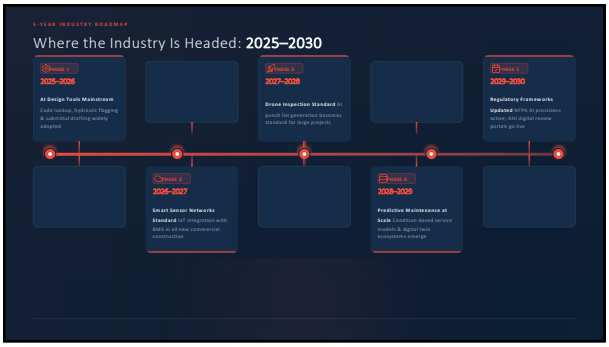

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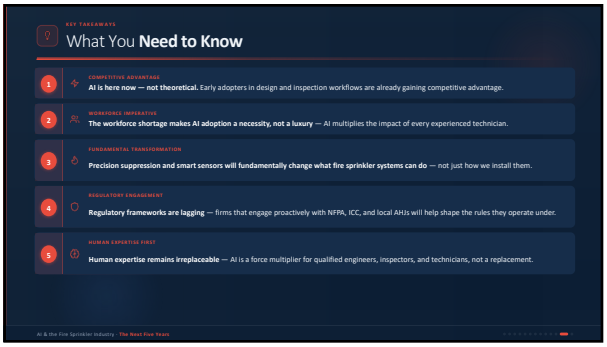

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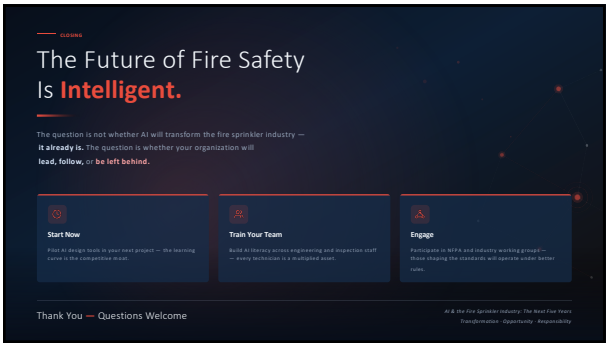

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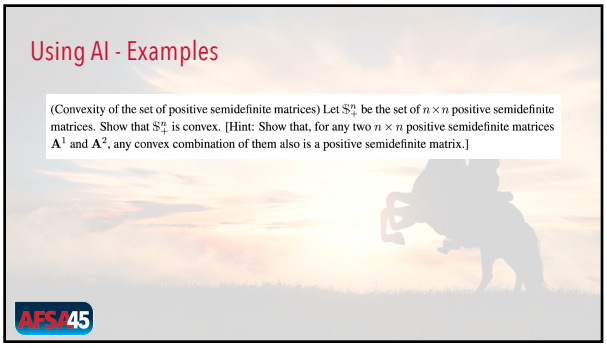

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Using AI Examples

- The following examples used Copilot, a Microsoft product

25

Using AI – Example No. 1

- What is the minimum pressure needed at a fire sprinkler having a k-factor of 5.6 and a required flow of 13 gpm?
- AI Solution in less than 2 seconds

26

Using AI – Example No. 1

- What is the minimum pressure needed at a fire sprinkler having a k-factor of 5.6 and a required flow of 13 gpm?
  - To find the required pressure, we use the **NFPA 13 sprinkler discharge equation**:
    - $Q = K \times \sqrt{P}$
  - A K-factor 5.6 sprinkler will deliver 13 gpm at about **5.4 psi**. This is **below the NFPA 13 minimum design pressure of 7 psi** for most sprinklers engicalchub.com+1, so in practice you would need at least **7 psi** at the sprinkler to meet code requirements, which would produce a flow of about 14.8 gpm for K = 5.6.

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Using AI – Example No. 2

- What temperature rating should I use for a fire sprinkler when the ambient temperature could be 150F?
- AI Solution in less than 2 seconds

28

Using AI – Example No. 2

- What temperature rating should I use for a fire sprinkler when the ambient temperature could be 150F?
  - **For a sustained ambient temperature of 150°F, NFPA 13 requires you to choose a sprinkler temperature rating that is at least 70°F above the maximum expected ceiling/ambient temperature — in this case, a minimum 220°F-rated sprinkler — and verify with a licensed fire protection engineer.**

29

Using AI – Example No. 2

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  - **NFPA 13 Answer: Intermediate (175F or 200F/175F – 225F) (Tables 7.2.4.1(a) and 7.2.4.1(b)**

30

Using AI – Example No. 3

- A solid beam protrudes 15 inches from a ceiling and is obstructing the discharge from a fire sprinkler located 6 inches beneath the ceiling. What is the minimum horizontal distance the sprinkler must be from the beam?
- AI Solution in less than 2 seconds

31

Using AI – Example No. 3

- A solid beam protrudes 15 inches from a ceiling and is obstructing the discharge from a fire sprinkler located 6 inches beneath the ceiling. What is the minimum horizontal distance the sprinkler must be from the beam?
  - **Using NFPA 13's "three times rule," the sprinkler must be at least 45 inches (3 × 15 in) horizontally from the beam's edge to avoid obstruction.**
  - **However, NFPA 13's beam rule tables and many interpretations require the *obstruction width* (beam depth) to be used in the "three times" calculation when the obstruction is a beam**
  - **If the beam is narrower than 12 in, NFPA 13 may ignore it; but at 15 in, it is significant.**

32

Using AI – Example No. 3

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  - **NFPA 13 Answer: 3 feet (Table 10.2.8.2(a))**

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Using AI – Example No. 4

- Using NFPA 13, what is the minimum size of the hydraulically most remote area for a dry pipe sprinkler system protecting an extra hazard occupancy using high temperature sprinklers?
- AI solution in less than 4 seconds

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Using AI – Example No. 4

- **AI Solution: Key Points**
- **No fixed "minimum size" exists** — it depends on the calculated design area for the specific hazard, system type, and sprinkler type.
- **Dry-pipe** and **high-temperature sprinklers** both require multipliers to the design area before applying the minimum width formula MeyerFire.
- Always verify the **adopted NFPA 13 edition** in your jurisdiction, as multipliers and formulas can change between editions.

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Using AI – Example No. 4

- Suppose the base design area for Extra Hazard is 1,500 sf.
  - Shouldn't this be 2500 sq. ft.?
- Dry-pipe multiplier = 1.3; high-temp sprinklers may also have a multiplier (e.g., 1.3 for certain high-temp types).
  - Correctly identified two adjustments identified in NFPA 13
- Adjusted area = $1{,}500 \times 1.3 \times 1.3 \approx 2{,}535$ sf.
  - Used the correct formula but high temperature sprinklers are a 25% reduction
- Summary: Quick but incorrect answer, or is it?
  - Actual correct answer is 2437.5 sf

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Using AI – Example No. 5

- What is the cost for an electric motor driven fire pump rated for 100 gpm at 60 psi and to be installed in San Antonio?
  - No answer provided but 1800 web sites identified

37

Using AI – Sprinkler System Design

- Vendor claims
  - Sprinkler system layouts in **MINUTES**
  - Estimator tools
    - Provide device counts

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What You **Need to Know**

1. **AI is here now — not theoretical.** Early adopters in design and inspection workflows are already gaining competitive advantage.
2. **The workforce shortage makes AI adoption a necessity, not a luxury** — AI multiplies the impact of every experienced technician.
3. **Precision suppression and smart sensors will fundamentally change what fire sprinkler systems can do** — not just how we install them.
4. **Regulatory frameworks are lagging** — firms that engage proactively with NFPA, ICC, and local AHJs will help shape the rules they operate under.
5. **Human expertise remains irreplaceable** — AI is a force multiplier for qualified engineers, inspectors, and technicians, not a replacement.

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Summary

- AI Tools available to use for sprinkler systems
  - Generic AI tools – Copilot
  - Sprinkler system specific AI platforms
- Limitations
  - Differences in codes and standards
  - Accuracy depends on information available in the platform
  - Human expertise remains irreplaceable
- Ethical considerations
  - You are responsible for your work product

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    - Login to app
    - Navigate to seminar survey
  - ✓ Surveys close 10/31/26

Thank you!

Bill Koffel
University of Maryland
wkoffel@umd.edu

Scan QR code to submit questions for **Ask the Experts!**

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