



Abstract

This project outlines our innovative design of a fire detection training simulator. As technology improves and systems change, it is crucial to keep inspectors and safety professionals educated and proficient. This project's purpose is to design a fire inspection simulator to enhance the training of fire safety professionals. This interactive system uses specific devices that are not only cost-effective but are widely implemented in multiple industries. The training provided will allow instructors and safety professionals an opportunity to review current fire protection devices as well as keep up to date with modern fire protection devices. The outcome is to have proficient trainees with a basic understanding of how systems are implemented, designed, and maintained. By creating this innovative training system, we can guarantee that trained individuals will be able to improve their knowledge and refine the skills required to operate the various kinds of alarm systems encountered in the workplace.

Introduction

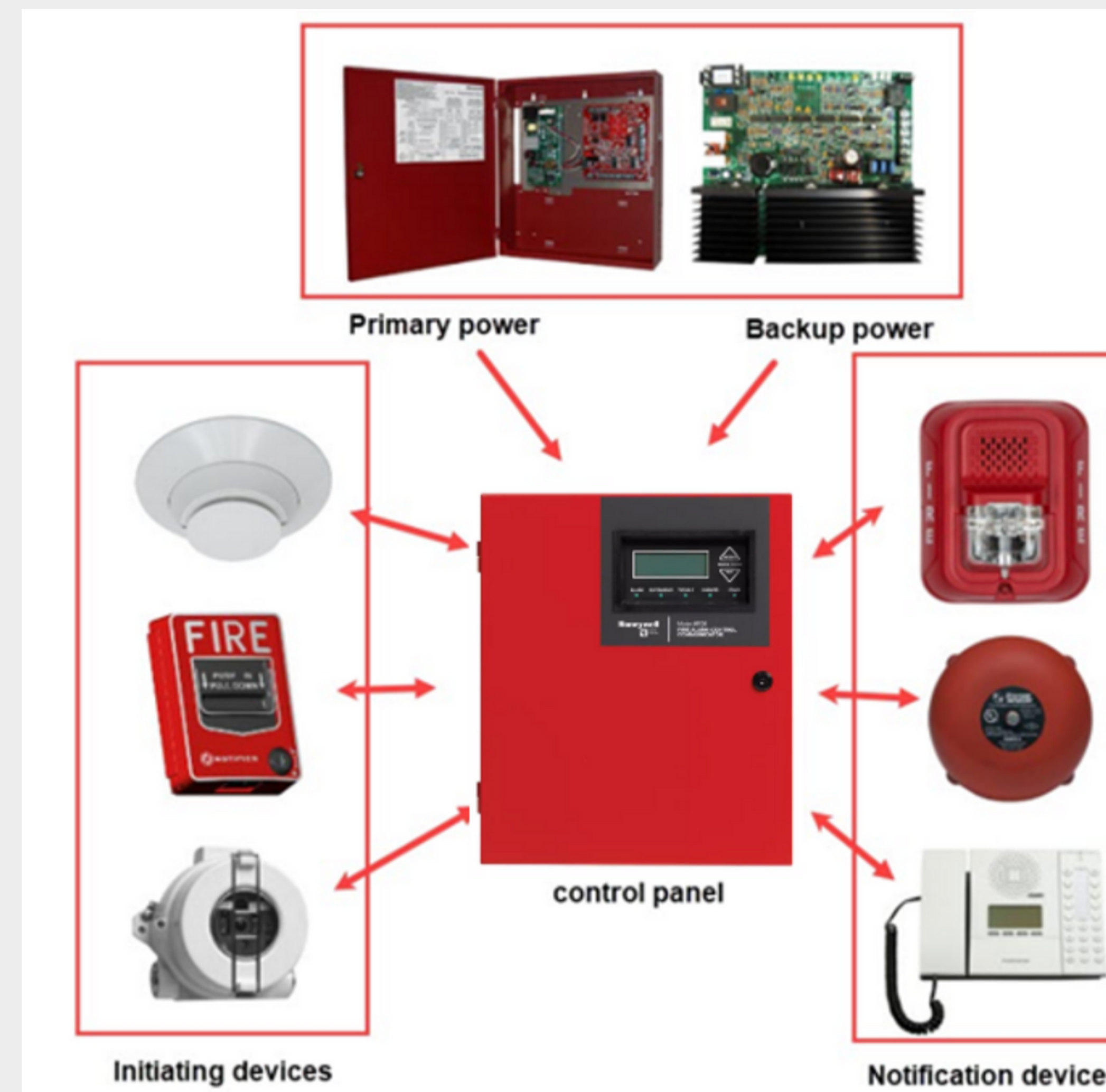
- With the inevitable passage of time, fire safety systems that are not regularly inspected and maintained begin to degrade.
- We aim to improve the current fire inspection training system to reflect our ideal training system which would allow inspectors and safety professionals to be up to date on the most used systems while also staying alert during routine inspections and training sessions.
- To achieve this we reviewed OSHA 1910 Subpart L, NFPA 72, and NFPA 101
- While reviewing this literature we strived to build a fire alarm inspection training system that would go beyond the requirements and recommendations to achieve our goal of eliminating complacency while inspecting fire alarm systems.

Methodology



The current state of fire inspection training systems involves a main control power unit accompanied by multiple different types and brands of control panels. There are little to no initiating or notification devices connected.

Design



We designed a Fire Control Unit that is able to communicate with all devices such as:

- Initiating Devices
 - Pull Stations
 - Sprinklers
 - Ionization and Photoelectric Sensors
- Notification Devices
 - Bells
 - Strobe Lights
 - Emergency Phone
- Power Units
 - Primary and backup power supply

Observations

During our research, we noticed a few key similarities between the different models of fire inspection training systems used by manufacturing companies.

- They lack multiple types of notification and initiating devices for inspectors to familiarize themselves with
- They feature rudimentary wiring systems that don't allow inspectors to be properly trained on fire alarm wiring and inspection
- They feature multiple control panels which may lead to inspectors mixing up certain procedures or signals

Conclusion

Our innovative design for a new fire training simulator strives to solve the issues that are commonly seen in the current fire training simulators in manufacturing companies.

- Complacency deriving from simple checklist training on too many control panels
- Wiring systems that encompass the initiating and notification devices to allow inspectors hands on training when fixing and inspecting wires
- A common and universal control panel used by the company to allow inspectors to focus on widely implemented control panels in the industry without crowding their training with outdated or rare control panels which can lead to just memorization of checklists instead of learning correct inspection procedures

References

- [1] Honeywell. (2017). 6700 - Addressable Fire Alarm Control Panel.
- [2] National Fire Protection Association. (2021). NFPA 72: National Fire Alarm and Signaling Code. Natl Fire Protection Association.
- [3] National Fire Protection Association. (2023). NFPA 101: Life Safety Code. National Fire Protection Association.
- [4] OSHA. (n.d.). The Federal Register. OSHA 1910 Subpart L.