



Incident Summary

**5-Alarm Commercial Fire
February 8, 2022 – Dispatch Time 6:33 p.m.
6161 N. Western Avenue
The Canton Apartment Complex**

The Oklahoma City Fire Department

This report contains the following sections:

- **The Incident**
- **Fire Operations**
- **Fire Codes**
- **Fire Investigation and Fire Cause**



The Incident



The largest known commercial fire in the history of Oklahoma City occurred at 6161 N. Western Avenue on February 8th, 2022. This large commercial structure, The Canton Apartment Complex, was still under construction when the incident occurred. The Oklahoma City Fire Department received a 911 call at 6:33 p.m. that evening stating that smoke was coming from the top of the building. This would initiate an incident that spanned three days beginning at 6:33 p.m. on February 8th and concluding on February 11th at approximately 3:00 p.m.

The Canton Apartment Complex consisted of 374,507 square feet, was five stories tall, and included a parking garage and two interior courtyard areas.

This incident was elevated to a 5-Alarm Commercial Fire Alarm Response which consisted of 49 pieces of apparatus staffed with 138 personnel plus additional support resources. The number of firefighters who ultimately responded to this incident was much higher as oncoming firefighters arrived each operational period to relieve those going off duty.

The complex was a total loss and there were no civilian injuries.

Fire Operations



After receiving the 911 call at 6:33 p.m., fire dispatchers initially dispatched resources to check smoke in the area. The initial response consisted of two Engines and one Ladder Company.

Engine 11 was the first Oklahoma City Fire Department resource on scene. They arrived at 6:37 p.m. and approached the incident from the south. Engine 11 observed the haze of smoke visible through the windows of the 5th floor of the southwest portion of the building. The officer of Engine 11 then requested the remainder of a Commercial Fire Alarm response be dispatched. This would summon three additional Engine companies, one additional Ladder company, the Heavy Rescue Unit, and two Battalion Chiefs.

Ladder 22 arrived shortly after and reported smoke showing along the roof, also on the southwest portion of the building. As the company officers of Engine 11 and Ladder 22 collaborated to initiate a plan of attack, Engine 22 arrived and reported fire was now visible on the roof.

A water supply was secured, and firefighters entered the secured building and ascended to the 5th floor where they observed an increasing amount of smoke in the hallway. Simultaneously, Ladder 22 raised their aerial ladder and observed a significant amount of fire on the roof. They then employed their master stream to attempt to knock

back the fire while the crews of Engine 11 and Engine 22 worked to deploy hose lines from inside the building.

More resources began to arrive and more water supply was established and additional attack hoses were deployed, but the fire continued to grow in intensity. As firefighters on the roof attempted to fight back the fire from their positions, additional fires kept breaking through in various locations on the roof. Complicating matters, the insulation board within the roof system spread rapidly underneath the roof covering hampering the ability to get water on the fire.

The fire progressed quickly despite aggressive firefighting efforts. In all, a 5-Alarm response was dispatched. Crews originally employed a combination strategy utilizing both exterior master streams comprised of six aerial ladders as well as multiple interior crews operating large hose lines working to extinguish the fires in the attic and other void spaces. The fire continued to spread across the roof and interior portions of the complex. With increasing fire intensity and large volumes of water adding to the weight and instability of the structure, the decision was made to withdraw firefighters from the interior and employ a defensive operation continuing to attack the fire from the exterior. Portions of the building were detaching and collapsing on the exterior as firefighters continued to reposition aerial ladders and other hose lines.

The Incident Commander and other senior officers continued to try to manage the situation by coordinating the efforts of their crews, but each time they attempted to make headway, those attempts were thwarted by fires that had started in multiple locations and were growing through large void spaces at a very rapid pace. Firefighters worked with great intensity throughout the night.

At 7 a.m. on February 9th, a shift change occurred. Firefighters from the C-shift reported to duty and relieved A-shift firefighters who had battled the fire all night long. The activities of February 9th consisted of continual use of overhead master streams and other hose lines from numerous vantage points to access the fire.

By February 10th, the fire had consumed the roof and much of the interior, and the structure was in no way safe for firefighters or fire investigators to enter. It was known by this time that the complex was a loss and that numerous hot spots still existed. An Oklahoma City Fire Department drone with thermal imaging capabilities was utilized and heat signatures were noted throughout the complex. Oklahoma City Fire Department officers met with representatives of the development to establish a plan to begin demolishing the building in order to expedite the process of fully extinguishing all hidden and inaccessible fire. The plan to demolish and methodically extinguish remaining hot spots ensued with mindfulness that a fire investigation was still underway. When the demolition crew reached the front of the building, demolition was slowed at specific times to allow fire investigators to inspect portions of the building and components thereof as they became accessible.

February 11th included a continuation of the demolition process, continued fire investigation, and continued extinguishment of newly-exposed fire and hot spots. Oklahoma City Fire Department resources were rotated at scheduled intervals during the demolition process. At approximately 3 p.m. on February 11th, the demolition was complete and all fire was extinguished. Oklahoma City Fire Department resources were released and the incident was terminated.

The monumental challenges our firefighters faced on the night of February 8, 2022, cannot be overstated. These challenges included:

- There were multiple areas of origin that were long distances from each other and on opposite sides of a fire wall.
- The enormous size of the building and the absence of a working alarm system allowed these fires to grow undetected for almost an hour before the fire department was alerted.
- The wood trusses used in the construction of the building supplied the growing fires with ample fuel and opportunity to grow unchecked.
- Though the premise was compliant with all applicable fire codes at the time of the incident for this phase of construction, the suppression systems, to include the automatic sprinklers and standpipes in the areas where our crews were operating, were not yet operational causing significant challenges to our suppression efforts.

Fire Codes

The Canton Apartment Complex was compliant with all applicable fire codes for that phase of the construction process.

The complex had permits issued to complete work according to approved plans for building construction, fire suppression, and fire alarms. However, no final inspections had been called in or completed. Final inspections are called in when all work is completed and the General Contractor is confident that the occupancy is ready to occupy. Regarding the Fire Suppression system, the Fire Code Compliance work section of the Oklahoma City Fire Department had only been called in to complete 50% (rough-in) inspections which include all overhead piping, hangars and clamps, overhead upright sprinkler heads, and down piping (pendant sprinkler heads if possible) if required to be installed: Also, the following guidelines are in place for contractors.

1) All system piping, hangars and clamps must be visible from floor level. NO sheet rock, insulation or ceiling tile shall be installed prior to the pressure and rough-in inspection without prior approval of your fire inspector. You will be required to remove any obstructions to view the complete system.

2) Prior to the system connection to the underground fire line, submit a certificate certifying the City of Oklahoma City requirements for flushing and testing have been met. To prevent a delay in conducting inspections, it is strongly recommended that the flushing approval be maintained on site at all times.

3) A Contractor's Material and Test Certificate for Aboveground Piping shall be submitted to your fire inspector at time of inspection

The Canton Apartment Complex passed all of its 50% suppression inspections.

In the IFC (International Fire Code) Chapter 33 , Fire Safety During Construction and Demolition, it states

3312.1 When required. *An approved water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material arrives on the site.*

3313.1 Where required. *In buildings required to have standpipes by Section 905.3.1, not less than one standpipe shall be provided for use during construction. Such standpipes shall be installed prior to construction exceeding 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access. Such standpipe shall be provided with fire department hose connections at accessible locations adjacent to usable stairways. Such standpipes shall be extended as construction*

progresses to within one floor of the highest point of construction having secured decking or flooring.

3314.1 Completion before occupancy. *In buildings where an automatic sprinkler system is required by this code or the International Building Code, it shall be unlawful to occupy any portion of a building or structure until the automatic sprinkler system installation has been tested and approved, except as provided in Section 105.3.4.*

In accordance with IFC water supply and standpipe requirements, the Canton complex was code compliant. The Canton complex established a temporary FDC (Fire Department Connection) connected to standpipe in the stairwell on the southwest side of the building with the appropriate signage on June 14th, 2021. However, it is not feasible during inclement weather that suppression systems be charged. The standpipe was operational as a manual dry standpipe at the time of the incident. Winter storms occurred on February 4th, and work was planned to commence the week on February 7th.

Also, in accordance with IFC automatic sprinkler system requirements, the Canton complex was code compliant. Occupancy of the building would not be permitted until all suppression systems had been tested and approved. The system was out of service considering it is not required to be in service until it has had final inspections for occupancy.

The TPO (Thermoplastic Polyolefin) roof material is made for high heat but not high heat with flame. Any roofing system that gets that hot would have similar results. However, the unique situation with TPO is when the firefighters put water on the roofing material, the TPO membrane (top layer) deflected the water, while the insulation was rapidly spreading the fire underneath. Though fire walls were in place, the fire continued to spread due to there being multiple areas of origin. (see Investigation report for explanation of multiple areas of origin).

Fire Investigation and Cause

The Fire Investigation work section of the Oklahoma City Fire Department worked diligently for many months to determine a fire cause for the Canton Apartment Complex fire. Investigators were present shortly after the fire began on February 8th and have worked methodically since that time to ascertain a cause. Through countless interviews, meetings, evidence review, surveillance video review, and other investigative processes, a conclusion was reached.

The complete fire investigation report is available per official open records request procedure (email cityclerk@okc.gov), but the conclusion of the investigation is as follows:

Based on the information gathered from processing the fire scene, the cause of this fire is classified as ACCIDENTAL. The data contained in this investigation summary is true and accurate based on information available at the time it was written. Findings, opinions, and conclusion may change if additional information is discovered after this report was written. If new information is discovered during the course of investigation, then alternate conclusions should be considered.

HYPOTHESES CONSIDERED AND UNABLE TO BE RULED OUT:

1. The fire occurred as a result of an electrically energized neutral (energized neutral) within the structure - An energized neutral was considered due to multiple areas of origin which were separated by a firewall. An energized neutral has been shown to cause fires. In normal building construction electrical power is supplied to the structure via the energized (hot) conductors and returned to ground via the “neutral” conductors.

An energized neutral happens when the neutral conductor is connected to the hot side. The neutral was a continuous run with no means of disconnect. When a neutral conductor is energized, the current flow will bypass any over-current protection devices present within the system and energize any conductive material attached to the ground system throughout the structure. A fire can occur due to a high resistant connection through these unintended electrical pathways.¹

To test this hypothesis, on June 14, 2022, this investigator participated in an examination of a transformer which supplied electrical power to the structure. This

¹ Stern, M. C., O'Hern, S. C., Morse, T. L., Bishop, J., & Kytömaa, H. (2017). Fire risks due to unintentionally energized metal structures. *Journal of Fire Sciences*, 35(5), 415–426. <https://doi.org/10.1177/0734904117702670>

examination was conducted by representatives from CMS Willowbrook, and OG&E. During this test engineers determined that an energized neutral was present in two separate meter bases. These separate meter bases had conductors ran to the areas of origin (on both sides of the firewall). Therefore, this ignition scenario could not be ruled out.

NFPA 921, Edition 2022:

19.1.1 Fire Cause Factors.

The determination of the fire cause requires the identification of those factors that were necessary for the fire to have occurred. Those factors include the presence of a competent ignition source, the type and form of the first fuel ignited, and the circumstances, such as failures or human actions, that allowed the factors to come together and start the fire. Device or appliance failures can involve, for example, a high-temperature thermostat that fails to operate. The device may have failed due to a design defect. Human contributions to a fire can include a failure to monitor a cooking pot on the stove, failure to connect electrical wiring tightly resulting in a high-resistance connection, or intentional acts. For example, consider a fire that starts when a blanket is ignited by an incandescent lamp in a closet. The various factors include having a lamp hanging down too close to the shelf, putting combustibles too close to the lamp, and leaving the lamp on while not using the closet. The absence of any one of those factors would have prevented the fire. The function of the investigator is to identify those factors that contribute to the fire.