

**STATUS OF THE NEW LABORATORY PROJECT  
AT  
OKLAHOMA STATE UNIVERSITY**

**ABSTRACT**

Significant portions of the new Fire Protection and Safety Laboratories operated by the Department of Fire Protection and Safety Technology at Oklahoma State University are nearing completion. The Fire Sprinkler Laboratory and the Fire Detection and Alarm Laboratory are more than 90% complete. The Fire Pump Laboratory is 2/3 complete. The 10 ft x 10 x combustion hood and exhaust system is in place and operational and the bench top fire dynamics laboratory is 50% complete. The laboratories are principally intended as instructional laboratories; however several research projects have already been completed using the new facilities. This presentation will describe the new facilities and summarize the laboratory capabilities and future needs.

Three years ago I came before the Symposium to report the ground breaking and beginning of construction on a new Fire Protection and Safety Laboratory building at Oklahoma State University. I am pleased at this time to make a progress report on this project. I am able to deliver the news that, although the laboratory will always be a work in progress as new technology is introduced, major portions of the laboratory are complete and are fully operational.

This laboratory project is particularly important to the Fire Protection and Safety Technology (FPST) program at Oklahoma State University. It represents the first capital improvement program undertaken specifically for this department since 1939. The laboratory's principle function is to provide hands-on learning opportunities for the FPST students with respect to existing and new technology involving automatic sprinkler systems, fire pump installations and fire detection and alarm systems. The availability of hands-on training has also resulted in a new explosion of demand for continuing education courses in inspection, testing and maintenance of fire protection equipment. Additionally, for the first time, the department has a facility that will support research projects and research contracts have been obtained. In the past, the FPST Department has never played a significant role in the fire protection research community. This new facility will provide the opportunity to change that. Increased research activity will improve the status of the department within the University and will at least change, if not improve, the reputation of the FPST program nationally and internationally.

This presentation is being made within the Suppression segment of the Symposium, so I want to principally address the features of the laboratory facilities related to fire suppression. The term "laboratory" has been used in the singular, but there are actually six different laboratories within the single building. These are as follows:

- Fire Pump Laboratory
- Automatic Sprinkler Systems Laboratory
- Multipurpose Area
- Fire Alarm and Detection Laboratory

Fire Dynamics Laboratory  
Industrial Hygiene Laboratory

I will discuss the first three in some detail and only briefly describe the final three areas.

The Fire Pump Laboratory houses four different pumps. There are two horizontal split case pumps, one driven by an electric motor and one driven by a diesel engine. There is also an electric motor driven vertical shaft turbine pump that takes suction from the tank constructed beneath the floor of the pump room. The fourth pump is not a fire pump, but is a continuous duty vertical shaft service pump that constitutes one of the water supply sources for the Sprinkler Laboratory and Multipurpose area. All three fire pumps are configured to deliver water through the test line or to the Sprinkler Laboratory or the Multipurpose area. The test line contains two in-line flow meters and terminates in a test header with hose connections. All three pumps are rated at 750 gpm and 120 psi.

The automatic sprinkler laboratory contains 24 operational risers. Control equipment for wet systems, dry systems, preaction systems, and deluge systems are installed on the risers. The laboratory is provided with a drain trench around the perimeter of the room to collect water from the main drains and from any spills and leakage that occur during normal testing and resetting of valves. This trench drains to the tank beneath the Fire Pump Laboratory which provides the ability to recirculate the water. Water supply for the sprinkler risers can come from the continuous duty pump, the city water supply or any of the fire pumps. There is a combination of new and old sprinkler valves and different configurations of valve alarms, monitoring devices and supervision.

The Multipurpose Area serves as a space where water can be discharged and where small fires can be burned. Piping has been configured so that any of the sprinkler valves or pumps can discharge into this space. A suspension grid has been constructed to support sprinkler branch lines and a suspended ceiling. One end of the space contains a 10 ft. x 10 ft. exhaust hood beneath which various materials or items can be burned. The exhaust duct is fitted with instrumentation to monitor temperatures, products of combustion and air flow rates. This Multipurpose Area is relatively small in size (20 x 50) and will not support large scale testing. It does, however, serve to permit the students to observe and measure sprinkler discharge patterns, flow rates, pressure losses due to friction and sprinkler discharge coefficients and response characteristics. This is also the space that has been utilized most frequently for research projects.

The Fire Alarm and Detection Laboratory contains multiple work stations with control panels and initiating devices at each station. The principle intent is to give students experience in understanding the functions of alarm system components and properly interpreting and responding to alarm and supervisory signals.

The Fire Dynamics and Industrial Hygiene Laboratories are still under development. The Fire Dynamics Laboratory is partially complete and contains bench-top materials testing equipment. The area contains three exhaust hoods and instrumentation for measuring temperatures and products of combustion. The Industrial Hygiene Laboratory currently contains one chemical hood with two additional hoods under construction. The emphasis here will be instruction on measurement of concentrations of hazardous gases and airborne particles.

Because of the new laboratory facility, OSU FPST students receive unprecedented exposure to the systems and equipment they will eventually encounter on the job. The hands-on experience they receive is one of the features that makes this academic program unique. This ability to receive this hands-on training is also what is attracting industrial, insurance and contracting organizations to OSU for continuing education. Customized contract training

courses are being presented to several companies while additional general courses are advertised regularly to the public.

So what is ahead? Certainly, there will be continual updating of equipment to match current trends in the industry. A water mist system and a gaseous agent system are soon to be installed. There remains a need in the fire pump laboratory for pump control panels of the most recent vintage. Current control panels all employ mercoid switches to automatically start the pumps. None are microprocessor equipped. The two panels controlling the electric driven pumps require entrance into the panel to take current and voltage readings. Replacement of at least one of these panels will be beneficial for exposing students to current control panel technology.

Finally, it is important to point out that the development of the suppression related laboratory spaces would have been impossible without industrial support. Almost every piece of equipment existing in these laboratories was donated by the manufacturer, distributors or contractors. Almost all of the labor required for installation has been donated by contracting companies owned and managed by OSU FPST alumni. Our special thanks go out to the following contributors of time and equipment and money:

- Western Kentucky Sprinkler Company
- Control Fire Systems
- Tyco Simplex/Grinnell
- Hughes & Associates
- Victaulic Corp.
- Viking Corp.
- Globe Fire Sprinkler Corp.
- Fairbanks-Morse Pump
- Peerless Pump
- Floway Pumps
- Metron, Inc
- Cla-Val Co.
- Reliable Automatic Sprinkler Co.
- Kennedy Valve
- International Fire Sprinklers, Inc.
- Anvil International
- Reddy-Buffaloes Pump, Inc.

With continued assistance from the fire protection and safety community, these laboratory facilities will remain current and make an important contribution to the education of current and future fire protection professionals.

