

## STORAGE SPACE: ANY THING BUT *EMPTY?*

### SAFE SCIENCE: BE PROTECTED

By Dr. Ken Roy\*

#### **PART I**

#### STORAGE SPACE VIEWS –

According to the many national science teachers associations' standards, adequate storage space for equipment and supplies, including a separate storage area for potentially dangerous materials should be provided. Although this statement is reflective of a professional standard, storage space is always an issue. In new middle/high school science laboratory construction and/or renovation projects, storage areas tend to be one of the places that architects look at as a way to reduce square footage. This strategy saves costs in effort to meet budget constraints. In some instances, there is the perception that storage is not important or needed. Yet, from a safety and environmental regulation standpoint, proper storage is a critical issue.

It is amazing that you will never hear a science teacher or supervisor say that they had planned for too much storage! In fact, it is always the opposite situation, so plan accordingly and be prepared to aggressively support it. The following information may be helpful in securing appropriate storage spaces during renovations and/or new construction projects for your science facility.

#### **Why dedicated space for storage?**

Dedicated space is required for the storage of labware, equipment, the safe and controlled storage of both hazardous and flammable/combustible chemicals, the temporary storage of students' projects, and/or other incomplete laboratory activities, etc. These types of storage require specific types of casework.

**Casework:** *A frame of wood, steel or other material which surrounds an enclosure that may contain shelves, drawers, or cabinets.*

It can be in the form of open shelving or cabinets with built-in adjustable shelving located in the laboratory or separate dedicated

storage spaces or rooms.

Legal requirements vary and are generally regulated for the non-hazardous or general laboratory materials. OSHA regulations such as the Housekeeping Standards and "trip/fall" and "slip/fall" hazards come into play. The safe storage of hazardous chemicals on the other hand is governed by many local, state and federal regulations.

How much space is needed?

Adequate and appropriate type of storage for chemicals, equipment, general lab ware, etc. is required in concert with OSHA housekeeping standard, NFPA 45 and other regulations. A general recommendation formula or professional guide for a preparation room and storage space is as follows:

*Preparation Room/Storage Area =*  
0.5 square meters (5.3 sq. ft.) per student workstation.

This is a working formula which will vary depending on the focus of the science program. For a more hands-on course or program, additional space for storage would be required to meet the needs of student work.

#### **General Storage**

As noted, general storage can be located in the laboratory and/or in a separate storeroom. In the laboratory, individual student storage as well as teacher and general class storage is necessary. Wall and base cabinets, drawer units, tall storage units, glass front wall cabinets, microscope cases and, large open/closed areas come in all shapes and sizes, depending on need. All storage should have appropriate lighting to reduce the chance of accidents or errors.

Another key to laboratory storage is security. All cabinets and drawers should be lockable to control and guard against thefts or damage. Remember, there are legal ramifications should a student take a piece of lab equipment/supplies out of the lab and it results in an injury. As long as there is a reasonable deterrent, the licensed educator is legally on solid ground in courtroom.

Consideration should be given to the following cabinet items:

- Two or more adjustable shelves.
- Solid hardwood construction in lieu of particle board.
- Cabinets should be securely anchored with known weight limits.
- An inside usable depth of at least 15 inches.
- Lock cylinders should be keyed alike for convenience.
- Self closing drawers/doors also promotes safety.
- All cabinets are required to be properly secured to walls or other suitable structural supports, to prevent movement during a seismic event or similar type of force causing motion.
- Step stools or stepladders should be available to reach high storage places safely.
- NFPA-13 requires that sprinkler heads have a clear distance of 18 inches (0.46 m) from the ceiling to the top of cabinets and/or shelves.
- Bottoms of wall cabinets should be 18 to 24 inches or (0.46 to 0.61 m) above the workstation counter tops.
- Wall cabinet doors should have glass panels in order to enhance safety by allowing the contents to be visible. Wired or polycarbonate glazing should be used for windowed cabinets and/or display cases.

Storage and operation of technology equipment such as laptop computers in drawers is another area for planning ahead. Some technology equipment tends to be heat sensitive and therefore requires sufficient ventilation or air movement. Forced air resulting from small fans or screens in the drawer may be helpful in preventing this problem.

#### **Resources:**

Occupational Safety and Health Administration: [HYPERLINK "http://www.osha.gov"](http://www.osha.gov) <http://www.osha.gov>  
National Fire Protection Association:

*Storage Continued*

HYPERLINK “<http://www.nfpa.org>”

<http://www.nfpa.org>

Safety in Academic Chemistry Laboratories:  
American Chemical Society, 1155 Sixteenth  
St., Washington, D.C. ( HYPERLINK

“<http://www.acs.org>” <http://www.acs.org>)

The International Building Code and  
International Fire Code: International  
Code Council, Inc., 4051 West Flossmoor  
Rd, Country Club Hills, IL ( HYPERLINK  
“<http://www.iccsafe.org>” <http://www.iccsafe.org>)

Author’s Note: Special thanks for his  
technical assistance in the writing of  
this article goes to John Dembishack. Mr.  
Dembishack has practiced architecture for  
more then 18 years, before entering his  
current position as a state fire marshal with  
the State of Connecticut, United States of  
America.

SAFE SCIENCE: BE PROTECTED

*LIVE LONG AND PROSPER SAFELY!*

\*Dr. Ken Roy

K-12 Director of Science & Safety

C/o Glastonbury Public Schools

Glastonbury, CT 06033-3099;

Authorized OSHA Instructor

Fax 860-652-7275

Email: [Royk@glastonburyus.org](mailto:Royk@glastonburyus.org)

***PART II: Storage Space: Any Thing But  
Empty! – Continued in next issue of  
Newsletter.***

