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Designing Flexibility into Laboratory Benches

Overview

The laboratory bench is the primary workplace in most labs. The traditional bench assembly consists of a wide, solid and durable benchtop with sink and utilities, anchored to fixed storage cabinets, with wall mounted shelving or cabinets. The bench assembly provides a researcher with essential elements to work: a large, stable surface for equipment and devices, access to sinks, power, data/ communication and piped services, and ample storage space. Traditional bench assemblies are durable, stable and long-lasting (figure 1).

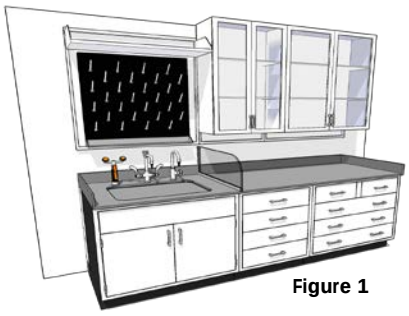

Figure 1

A disadvantage of the traditional bench assembly is that its elements are fixed in place, and any significant modification is a construction project. Although traditional lab casework is nominally modular, modifications require that sections of bench be disassembled by a team of contractors, usually shutting down a lab. Modifications may not be a concern in a lab that has dedicated long-term programs, but may be a continuous fact of life for a lab with changing researchers, methodologies and equipment.

Designing laboratories with a level of flexibility can make the modifications easier, faster and less costly. Typical changes that may occur:

- Moving or removing base cabinets to create under counter knee spaces or equipment space.
- Moving or removing benchtops to create floor space for equipment.
- Raising or lowering benchtops for accessibility, or to change from bench to desk height.
- Removing or adding wall cabinets or shelves.

Flexibility, which will reduce the cost and disruption of minor modifications, can be achieved in a number of ways, using traditional bench systems or flexible bench system.

Traditional Bench Systems

Traditional bench systems can be designed to add a level of flexibility, and allow a degree of modification by lab personnel (figure 2).

- Benchtops can be supported on legs, eliminating fixed base cabinets.
- Base cabinets on wheels can be used under benchtops, allowing base cabinets to be relocated as needed. Mobile base cabinets can be fitted with durable tops, so that they can function as pull-out work surfaces.
- Labs can utilize lab carts and tables in lieu of fixed benches in areas where sinks and the stability of fixed benches are not required.
- Adjustable, removable wall shelves can be used in lieu of fixed cabinets.

If traditional systems are made flexible, the distribution mode of power, data and other services should be considered so that they are equally flexible. Strategies include locating outlets along the walls at regular intervals (high and low) and in the ceiling so that they are accessible to floor and bench mounted equipment in multiple lab configurations. Hard-connected items, including sinks, fume hoods will be fixed elements and should be located strategically at the perimeter of the lab.

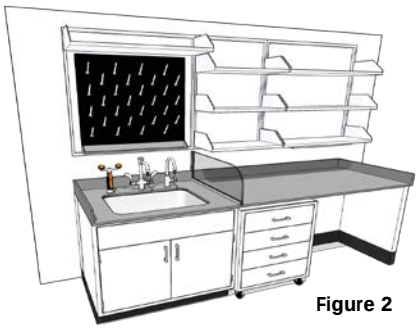

Figure 2

By replacing fixed elements with mobile and movable elements a degree of flexibility can be designed into the lab, most of which can be done by lab staff or maintenance personnel.

Flexible Bench Systems

Flexible bench systems are specifically designed by lab casework manufacturers as interchangeable components which can be modified and reconfigured with relative ease. Systems consist of a steel bench frame supporting an adjustable height benchtop. Base cabinets are typically suspended from the frame. Frames and cabinets are not fixed in place, but on floor glides or locking wheels (figure 3).

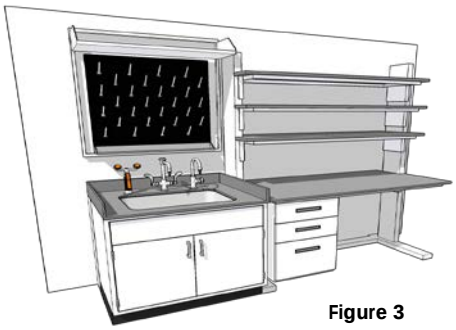

Figure 3

Bench frames have vertical extensions which support adjustable/removable shelves or cabinets, and through which power, data and other services can be routed.

Flexible bench systems components are designed to be reconfigured by lab staff or maintenance personnel, depending on the scope of the modification. Most work can be done quickly, with limited disturbance to lab operations.

Next Issue: Advantages and disadvantages of Flexible Bench Systems.

Added for further reading:

Research Laboratory, Whole Building Design Guide,
http://www.wbdg.org/design/research_lab.php
Trends in Laboratory Design, Whole Building Design Guide,
http://www.wbdg.org/resources/labtrends.php