AN INTRODUCTION TO ACCESS FLOORING

The Foundation of the Wall and Ceiling Industry brings you a historical article as relevant today as it was then

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The following feature article appeared in the March 1976 edition of Construction Dimensions, and reprinted here as another in a series of historical articles presented by the Foundation of the Wall and Ceiling Industry.

The article can serve as a primer on access flooring by providing basic information about the advantages, uses, design and installation of these systems. Though published 12 years ago, the article’s information on design loads, panel configurations, understructure grids, and finish material is essentially still current today.

However, for guidance on specific installations, consult the particular manufacturer to verify design data and installation procedures.

Initially designed and introduced for computer rooms in the mid-50s, modular access floors increased in usage and flexibility for the more-specialized equipment areas during the 60s.

Now in the 70s and particularly since the energy-crisis, we see multi-purpose access floor systems being cost-evaluated and designed into many types of non-residential construction.

Life-cycle costing is a concept being used today more than ever before in building design . . . primarily due to the higher cost of energy since the early 70s. It is now reasonable to assume that the U.S. will never return to the “cheap” energy years of the 50s and 60s . . . and it is safe to predict that construction costs (both material and labor) will also continue to rise.

For many years, architects and building designers have incorporated a high degree of “flexibility” into their designs . . . but at an installed cost which is no longer practical due to the high cost of money, energy and construction. The flexible-use concept is accomplished by the “over-design” of such environmental factors as general illumination, air conditioning and acoustics of the interior space as well as the design of utility services to provide electrical, mechanical and communication facilities wherever and whenever they are required in the future.

Unfortunately, this building design approach leads to large capital outlays and excessive building costs . . . certainly a detriment to the continued growth of the construction industry.

Floor/Ceiling Planes

A great deal of my past experience has been associated with the coordination of the environmental factors of lighting, air distribution and acoustics within building interiors. These three elements “integrated” within the space are fundamental to the success or failure of an interior design. While much attention has been given to the ceiling plane (and deservedly so) there is much to be gained by incorporating multi-purpose, modular, access floors into the total design concept.

These systems are extremely flexible and can readily and effectively conceal many of the utility services required to make space functionally efficient as well as economical to operate and maintain.

The physical make-up of the so-called computer floor has not materially changed over the years. The modular panels in convenient 24”x24” and 30”x30” sizes are supported by adjustable pedestal assemblies that are in turn adaptable to different understructures as required by the type and size of the installation.

Panel Types

Computer-rated (CR) panels are designed to withstand concentrated loads of 1000 lb/sq. in. anywhere on the panel and/or uniform loads of 250 lbs/sq. ft, without exceeding maximum allowable deflections. On the other hand, general construction (GC) or multi-purpose, access floor panels are designed to support 500 lb/sq. in. concentrated loads and/or uniform loads of 125 lbs/sq. ft. again, without exceeding certain maximum allowable deflections depending on the application.
There are “centralized” data processing control facilities being designed and built where CR floor panels are installed in the computer and related equipment areas while the general office space feature the lower-cost GC panels. Since the physical dimensions of the CR and GC panels are identical (i.e. only material gauges vary), the same under-structure can be utilized throughout the entire building. Thus, as computer areas are modified or expanded in the future, proper-strength panels can be changed and/or installed as required.

**Understructure Variety**

Three types of understructure are generally available (refer to diagrams) . . . (1) free-standing or pedestal assemblies only (2) drop-in or removable-grid and (3) rigid grid or continuous beam systems. Each has its own advantages depending on:

  (a) type of application  
  (b) height of floor  
  (c) size of area  
  (d) future mobility  
  (e) maintenance activity

While there are no “hard and fast” rules concerning when to use such a system, there are certain general guidelines to be considered. For example:

Free standing (i.e. panel/pedestal) systems are used for the shorter (ex. 5"-10") finished floor heights (FFH) and/or the relatively small areas contained by walls on four sides.

Grid members or stringers are utilized for the higher (i.e. 12"-24" FFH or more) floors with rigid grid systems being recommended for 18" FFH and higher and/or where the floor areas are large and open.

The primary function of the grid is to provide lateral stability for resistance to rolling loads and/or horizontal forces . . . which are more critical as the floor height increases. For these reasons, it is desirable to install a combination of 2' and 6' stringers to achieve a more stable understructure system.

However, where the height of the computer floor is not too great (i.e. below 18") and where changes in equipment and/or utility services will be frequent, the drop-in or removable grid members are certainly desirable from a cost and maintenance point of view.

**Floor Coverings**

The most significant changes that have been introduced are in the floor coverings used. While vinyl and vinyl-asbestos tiles are still being installed today, high-pressure laminate (HPL) materials are far and away the most popular coverings used in the computer or computer-related areas. More recently, however, improvements in carpeting materials and laminating techniques have increased its demand for multi-purpose access flooring systems.

The obvious advantages of carpeting are:

  (1) Improved appearance . . . more comfortable and esthetically pleasing.  
  (2) acoustically soft-surface . . . quieter—less traffic impact noises.  
  (3) Less maintenance . . . easy to keep clean—vacuum and occasional shampoo.

The commercial grades of carpeting today feature a high degree of soil resistance, durability, resilience, color and pattern variety, static control, cleanability and texture retention.

The most recent improvements in carpeting for modular, access floor panels have been the popularity of carpeting laminated to “full-size” panels (i.e. less trim edge) . . . making it a more-monolithic appearance (i.e. similar to broadloom).

Certain approved types of cut-pile as well as tufted and looped carpets can be successfully die-stamped and applied to modular floor panels to achieve this desirable effect. The natural mobility and interchangeability of the panels can minimize carpet wear, particularly the high-traffic areas of a building.

**Specialized Application**

As indicated earlier, computer-floors have gradually earned their way into the more-specialized buildings and/or area types. The space between the floor slab and the accessible panels is an
It is reasonable to assume the U.S. will never return to cheap energy . . . and construction costs will continue to rise.

Ideal plenum to house utility services such as electrical conduit and wiring, telephone and other communication cables, mechanical ductwork and piping.

The plenum can also be utilized for air supply or air return, depending on the installation requirements. In addition, the extreme accessibility to these services and the flexibility of the floor layout provides unusual operating advantages and cost savings over the life of a building.

These benefits made modular, access floors adaptable to laboratory buildings for educational, government, military and industrial use. Control and equipment facilities for utilities (power and telephone) as well as airport and other transportation terminals are also ideal applications for multi-purpose access floor (MAF) systems.

Remodeling Concepts

The “teardown/bulid-up” philosophy characterized by many urban redevelopment programs is taking new form. Fifty to sixty-year old buildings (with typical high ceilings) that would normally be torn down are now being cost-analyzed as to how they can be renovated to serve today’s and tomorrow’s needs. Suspended acoustical ceilings that integrate the latest in lighting and air distribution equipment are ideal systems to improve the interior environment.

But what about the all-important floor area? It is here where the additional power, mechanical and communication services can be concealed and distributed to the flexible furniture arrangements of work stations and desk areas situated on the new, totally level and carpeted MAF system.

The renovation market is a growing business opportunity and a prime reason for all system-oriented contractors to investigate and promote the many advantages of MAF systems.

Life-Cycle Costing

It is in the tremendous new construction market of commercial buildings that we find the biggest and most-dramatic potential for MAF systems. As was stated earlier, the high cost of money, energy and construction has changed the thinking of most architects, engineers, contractors as well as building owners and/or tenants.

No matter where you are in this group, life-cycle cost evaluations should now be an important part of your business responsibility. Coordinated and efficient environmental systems, economical and safe building products, flexible utility services, freedom of space and furniture layout, modern installation methods, practical and low-cost maintenance procedures are all essential elements of any new building design.

Over the years it has been demonstrated that “big government” is generally slow to change or move in different directions quickly. One significant departure from this “rule” has been actions taken by the General Services Administrations following the impact of our energy crisis. GSA is the business arm of the federal government, and, as such, is responsible for some 10,000 buildings now in operation as well as future construction, which is currently being completed at
a rate of 20 to 60 buildings per year.

Lifecycle cost analysis is a prime factor in GSA building designs with respect to both initial and operating costs . . . relating to construction and energy matters.

Many innovations such as non-uniform/task lighting and speech privacy components are being design-evaluated . . . including the more general use of MAF systems throughout entire government-owned office buildings.

For example, the plenum spaces on the top and bottom of the ceiling and floor planes respectively can be properly coordinated and dimensioned to provide the most efficient yet flexible interior space between the “sandwich” construction of two floors.

First of all, MAF systems can be integrated and installed faster within the construction schedule . . . resulting in time savings and earlier occupancy. The MAF “skin” over the rough slab provides an extremely level floor that permits faster and more economical partition attachment. The flexibility of electrical and communication services within the plenum permits fast, economical change in office and furniture lay-out.

This low-cost relocation activity alone results in significant cost savings over a building’s life. It has been estimated recently that it costs about $100 for each desk or work station relocation including service modifications on conventional-type floors. With MAF, the work can normally be done with maintenance crews at a fraction of the time and cost and with little disruption to the work force.

During my travels around the country, I’ve discussed installation costs and procedures with numerous contractors. Naturally, the methods will vary somewhat depending on the type and size of job as well as the understructure involved. But even on the very common jobs, each contractor seems to have developed his own expertise that provides (for him) the most economical installed cost.

Labor-saving devices such as lasers (for leveling), jigs (for sub-assembly) of grid understructure), manpower-team utilization as well as material handling and cutting equipment are just a few of the various ways contractors are reducing their labor and installation costs.

There’s no doubt about it, ceiling and wall systems will be coordinated with multi-purpose access floor systems for many commercial buildings in the years ahead . . . and the total package represents a growing opportunity for interior system contractors.

As computer areas are modified or expanded in the future . . . panels can be changed as required.

The Foundation of the Wall and Ceiling Industry maintains the John H. Hampshire Research and Reference Library and invites AWCI members to consult the many references available on a wide range of subjects—from general business practices to technical data.

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**DROP-IN GRID**

**FREE STANDING**

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