Maintaining An Access Floor System

Why maintain your access floor?

The data processing operations of your business is a significant investment. In fact, based on a square-foot analysis, for most companies, the data center is the largest single real estate investment. The service that the data center provides is just as important, if not more, than the significant investment. For most operations, it is critical that this service not be interrupted. Maintaining the structural integrity and the cleanliness of the environment can help ensure the continuity of service.

The purpose of an access floor maintenance program is to maintain the structural integrity of the access floor system and to bring the floor back within its original installed specifications. There are a number of reasons why the access floor system and the sub-floor plenum should be maintained. Listed below are the adverse conditions that occur in a data center and how they can create problems.

Adverse conditions:

» Missing trim edges

» Deformed panels

» HPL de-lamination

» Missing stringer or pedestal head gaskets

» Understructure failure

» Sub-floor dirt and dust

Possible adverse results:

» Premature HPL breakdown (panel replacement required)

» Dirt buildup adversely affects computers

» Possible point of catastrophic failure

» Safety-trip hazard

» Increased vibration adversely affects computers

» Safety floor failure

» Dirt buildup adversely affects computers

» Unwanted fire alarm will unnecessarily shutdown (EPO) computer operations

Adverse conditions

A variety of conditions contribute to an unstable access floor, including trim edge breakdown, panel breakdown, panel instability, and understructure failure.

Trim edge breakdown

Older access floor panels have an edging material around the perimeter. The purpose of this edging, or trim edge, is to protect the high-pressure laminate (HPL) that covers the panel. HPL is a hard surface that can chip easily. With a trim edge, the HPL is protected and less likely to chip. Trim edge breakdown can simply occur because of age.

But it can also occur when panels are incorrectly re-installed in an access floor system. Often, a panel is placed in its approximate position and stamped into place. The stamping puts an inordinate amount of strain on the trim edge and can cause it to either break or contribute to premature failure.

The absence of a trim edge can create a number of problems.

1. The HPL edge of the panel is exposed. This exposure is mostly a factor in areas where there is caster traffic (aisles and areas where there are chairs). If the HPL is damaged, that panel will need to be replaced.

2. The 24-inch dimension of the panel is reduced, allowing the panel to move horizontally. In some wood core systems, the movement can be significant enough to allow the panel to fall through the stringer system that supports it.

3. From an environmental standpoint, missing trim edges create a pocket for dirt and dust to collect in and fall through to the sub-floor. This process creates additional material that is combustible. More impor- tantly, if the sub-floor is being utilized as an air supply plenum, the dust and dirt can be blown into computer equipment.

Panel breakdown

Panel breakdown can result from numerous occurrences in a data center. Panel breakdown can include the following conditions:

1. HPL de-lamination. The covering of the access floor panel begins to "lift off". Essentially, the adhesive bond between the steel top sheet of the panel and the HPL breaks down. This damage can occur due to age or maintenance practices. Wet mopping will allow water to penetrate the HPL via the trim edge and cause premature de-lamination. (An access floor should never be wet mopped. A dry/damp mop should be used. For stains, a cleaner such as 409 can be used.)

2. Deformation. Panel deformation occurs most often when the panel is subjected to a load that exceeds its performance rating. In almost all cases, a panel will not break, but the deflection the panel experiences becomes permanent. As a result, the panel will not sit properly in the understructure.

3. Wood core panels. Because of their construction, wood core panels are more subject to panel breakdown than the welded panels (all steel and cementitious-filled panels). Wood core panels are held together with adhesive. The top sheet and the bottom pan are adhered to the particleboard core. Although this is an economical method to construct an access floor panel, there are some inherent problems. Adhesive break-down, caused by age, water, or excessive humidity, will result in panel breakdown.

Panel instability

Often referred to as "rockers", panel instability is caused by panel deformation (as described above) and the existing condition of the panel support system or understructure. Panel instability increases the amount of vibration of the access floor system. Microprocessor-controlled equip ment, subjected to vibration, undergoes additional stress, which could reduce its life.

Instability can be caused by missing components. Some access floor systems have sound-deadening gaskets (pedestal pads and stringer covers). If these gaskets are missing on one pedestal or stringer and not the other, the panel will be resting on slightly different elevations and will become unstable.

Phase five - post-project review

In this phase, a post-project review is executed to ensure that all work has been accomplished successfully. In addition, final technical information is transitioned and any remaining administrative tasks are finalized. Finally, final project documentation is compiled and presented.

Data center migration best practices

Your organization has decided to execute a data center migration. Before you throw yourself wholeheartedly into the project, remember these best practices:

» Plan, plan, plan. Before a data center migration is executed, clearly define exactly how it should go. Outline the migration step by step---no matter how minute a step may seem. The plan should also include taking inventory of every piece of equipment that is being relocated and where its destination is. Finally, it is critical to determine relationships among all applications.

» Prioritize equipment. Determine the order that the servers can be taken offline, migrated, and re-started. Move the most important equipment first.

» Perform an additional backup. Whether it's regularly schedule for that time or not, perform a backup immediately before the migration.

» Label everything. Label equipment racks and servers by color. Make it clear what servers go in which rack. Label the equipment racks with their corresponding destination grid number.

» Conduct a post-move audit. Always double check to ensure that the data center migration accomplished the tasks that were laid out, in the sequence that was determined, and with the results needed.

Data center migration requires focus and determination. Understanding exactly what steps are involved and following proven best practices will ensure a successful project.

1. All access floor understructure systems have the capability to be manually leveled according to field conditions. The pedestal head or base has a leveling nut. Over time, and due to the floor being accessed, the leveling nut is turned and requires re-adjusting.
2. Occasionally, instability is caused by understructure failure, which is addressed below.

Understructure failure

When understructure failure occurs, it will be readily apparent. The key is to prevent its occurrence by identify- ing at-risk conditions and correcting them. Failure is created by:

1. Pedestal deterioration. Rust will cause the breakdown of a pedestal. Rust occurs most often near the packaged air conditioning units or chillers due to water spills or high humidity conditions over long periods of time.

2. Pedestal failure. This occurs most often in aisles where, over the course of time, heavy loads are moved in and out of the data center. It also occurs in areas where there is a significant concentration of electrical cables. When cables are pulled, the significant lateral force can break the pedestal adhesive and "kick out" the pedestal base slightly. If the base is not perpendicular to the floor system, the welds that attach the base plate to the tube can break.

Importance of a clean data center

A clean data center, both under the floor and in the room, can result in a dramatic increase in system reliability.

There is an abundance of technical information available describing the behavior and effects of airborne contamination in high-tech equipment rooms. For example, studies published by the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) demonstrate the tendency of contamination to seek out electrical components. Airborne particles pick up static charges as they float about in the data center environment. This causes them to seek oppositely charged surfaces and to plate out over them. In an electronic circuit board, dust finds its natural home. Since nearly all particulate can conduct electricity when heated to a liquid state or when it has absorbed moisture, the result of plating on a circuit board is often a short circuit. At best, such a short may be a momentary event without ill consequence. However, the short may also cause board failure and equipment shutdown or, in extreme cases, a flash fire.

It is important, then, to keep the amount of dirt and dust within a data center facility to a minimum. Regular cleaning by a professional, experienced staff is the best course of action. Experts agree that a regular janitorial staff should not be used to clean a computer room since they are not aware of its unique requirements. For example, a janitorial staff may make the data center look clean by vacuuming, but will have blown a lot of dust and sub-micron particles out the back of the vacuum, creating more problems instead of helping to deter them.

Regular, professional cleaning will help data center managers avoid the problems associated with airborne contaminates and will therefore improve network reliability.

There are numerous reasons for keeping a data center clean. For example:

» A clean data center reduces the possibility of unwanted fire alarms since dirt causes smoke detectors to alarm, resulting in loss of data (if your detection system is tied to your EPO or circuit) and unnecessary evacuation of the building.

» A clean data center optimizes equipment performance and the investment of a regular scheduled data center cleaning service equates to a fraction of the overall investment of running your operations center.

» Clean data centers minimize maintenance and filter replacement on computer room air conditioning units.

» All components within the operations center are at risk when a data center is not kept clean.

» Cleaning below raised access flooring will help keep unwanted dirt and dust from mixing into the

data center air.

Typical scope of work

A typical scope of work for data center maintenance should cover the following items (there may be additional issues present, and not all of these issues may apply to your data center):

1. Re-leveling of understructure to eliminate unstable floor panels. A laser level should be used where appropriate.

2. Replacing missing or cracked trim edges. This will significantly reduce the amount of gapping that occurs. Trim edges should be supplied on a unit price basis.

3. Replacing damaged or missing understructure parts if required. Parts should be supplied on a unit price basis.

4. Replacing permanently deformed panels if required. Panels should be supplied on a unit price basis.

5. Adhering any pedestals that have become dislodged.

6. Ensuring that all stringers are secured with fasteners and that the fasteners are sufficiently tightened.

7. Replacing stringer covers or pedestal pads where required. Covers should be supplied on a unit price basis.

8. Cleaning the surface of the access floor as well as vacuuming and wiping down the stringers and under- structure.

9. Vacuuming sub-floor using special equipment designed to trap all particles that are drawn into the vacuum equipment and any particulate that may become airborne during the lifting of the access floor panels.

The environmental vacuums used should be designed to entrap particles as small as .3 microns with over 99.97 percent effectiveness. Some vacuums use a three-stage High Efficiency Particulate Airfilter (HEPA) filter system. This includes a primary paper filter, an impact printer, and the HEPA filter on the vacuum motor. The vacuum should be acceptable for Class 100 Clean Room usage.

Taking care of high-pressure laminated floor tiles

The access floor surfaced with HPL is designed for years of service with a minimum of care and cleaning. By following these simple do's and don'ts, you will get the maxi- mum life from this unique floor surface.

Do:

1. Keep floor clean by damp mopping with a mild house hold detergent.

2. Provide protection from sand and chemicals traced in on shoes by providing "walk-off" mats at entrances.

3. Rotate panels in high use areas to areas of low traffic.

This spreads years of wear over the entire system

Don't:

1. Wax. It is never necessary.

2. Use anything but a damp mop. Copious quantities of water can attack the adhesive and cause de-lamination.

3. Use string abrasives or scrapers to remove stains.

Bick Group has subject matter experts in this and many other topics. Talk to our Access Floor experts by emailing: rmahoney@bickgroup.com