



SCHOOL SYSTEM FLOOR MAINTENANCE PROCEDURES

It has been my experience during my 20+ years in our industry that there is no one, perfect, maintenance program. Procedures can and should be kept flexible enough to accommodate varying conditions, provided the procedures are performed correctly and produce the desired end results. Procedures that don't provide the desired results should be examined and modified until they do. Maintenance programs require that certain procedures be performed. Performing these procedures requires an appropriate balance between people and the type of equipment they have available. The more manual equipment is used, the more people and time will be required to perform a given task. The challenge in purchasing more sophisticated equipment to make your staff more efficient, is that it involves budgetary allocations and the purchase priorities of the entire school system. Perma's goal is to help school systems analyze procedures that don't seem to be providing the desired results and based on the information we've accumulated from similar situations, offer choices for solutions.

Stripping and Refinishing

The question is often raised whether it is really necessary to strip and refinish all of the floors in a school system each summer. Stripping during the summer vacation is a procedure commonly performed by school systems. It is necessary in situations where appearance and gloss levels are maintained primarily by scrubbing and recoating. Routine scrubbing and recoating often produces a buildup of floor finish during the course of a year that usually needs to be removed before it gets too thick. The definition of "too thick" generally applies to finish that has become unsightly due to deep scratches, variably wear patterns, foreign matter embedded in it, or is at the point where any additional build-up will make it difficult to remove. This procedure requires the allocation of significant personnel resources to perform the work. Summer vacation is usually the only time during which custodians have adequate, uninterrupted access to the areas that need to be stripped and finished. This means the work is often performed during the most difficult weather conditions for these procedures. Obviously purchasing the stripper, finish, stripping pads, mops, etc. all contribute to the cost of the procedure. All combined, these factors can make this a more expensive program to implement than some of the alternatives. However, in circumstances where the availability of personnel, equipment and other resources make implementing an alternative program unpractical, this type of program is still quite viable for maintaining the appearance of floors.

High Speed Burnish/Scrubbing and Recoating

The alternative to the previously mentioned program is what in most cases the schools are attempting to do now. The type of program I am referring to focuses resources on effective routine maintenance procedures like washing, high speed burnishing and periodic deep scrubbing and re-coating to maintain appearance levels. The consideration in implementing a program of this type is that the staff needs to have sufficient personnel, appropriate equipment for the available personnel and the time to implement a consistent, effective maintenance program. With this type of program, scheduling conflicts, demands on custodians' time and alternate priorities can interfere with the program to the point where it can start to break down. Custodial staff must remain aware of traffic and wear patterns throughout their facility and be able to respond during the school year, even though things are in full swing. The positive aspects of this type of program is that they are generally very cost effective and provide maximum flexibility. Periodic deep scrubbing and recoating is used to maintain a base that responds to the routine maintenance

procedures. Stripping and refinishing is only performed on areas that cannot be restored by the other maintenance procedures.

Removing Large Particle Soils

The first step in any floor maintenance program is to remove large particle soils like dirt and sand. There is nothing more detrimental to any floor coating than the abrasion created by dirt and sand. At its worst, these soils being left on a floor can be paramount to having people walking around with sandpaper on their shoes. These soils often have specific gravities that are so high they cannot be suspended by the sequestering agents in cleaners and aren't removed by damp mopping or sometimes even automatic scrubbing procedures. These factors make vacuuming or sweeping floors on a regular basis a critical part of an effective maintenance program. Vacuuming is the most effective method for removing these soils, at least in smaller areas. The issue with vacuuming larger areas is that it is slower and more labor intensive than sweeping or dry mopping. Sweeping is most effective on irregular surfaces such as slate, brick, concrete or ceramic tile. Dry mopping with either treated or untreated dry mops is effective on smooth surfaces like vinyl composition tile or wood. Mop treatments are formulated to enhance a dry mop's ability to pick up fine soil. Dry mop treatments come in two versions, oil and water-based. Both work quite well when used correctly. Oil-based mop treatments are generally supposed to be applied 24 hours in advance of being used. When the application isn't done far enough ahead of time, oil-based treatments can leave a residue that will cause floors to become slippery. Water-based mop treatments like Perma's #135 Aqua-Treat are also best applied ahead of time. One advantage of the water-based treatments is that any residue that is left from dry mopping is readily water-soluble and will be removed when the floor is washed with the EM1005 Neutral Cleaner or EM1035 Cleaner/Restorer.

Matting

Another issue that relates directly to this procedure is how to reduce the amount of soil that actually enters a facility and then must be removed. This issue becomes particularly acute in areas like New England during the winter months when safety concerns dictate that parking lots and sidewalks receive substantial applications of sand and ice melting products. The Calcium Chloride, Potassium Chloride, Urea Salt, etc., that ice-melters are made from, becomes suspended in the water they create. The water also helps sand and dirt adhere to footwear, resulting in it all being tracked into facilities and onto the floors. Addressing this situation again requires a balance between sometimes competing concerns. When possible, facilities should try to make sure that they aren't over-applying sand and ice-melters. Over-application costs money both in sand and ice-melter and in the labor required to clean it up after it enters a building.

One way to reduce the amount of soil that enters a building throughout the year is by the effective use of matting. Here again, different matting is designed to perform different functions. Rubber finger matting for example is designed to remove large particle soil and sand and trap it in the mat before it can enter a facility. Finger matting however, doesn't remove moisture or fine soils so it needs to be supplemented by some form of absorbent fiber matting. Another critical factor is making sure the matting is long enough to effectively remove soils and moisture. Generally, each type of matting should be long enough, to allow the average visitor to take 4-6 steps on the matting. Assuming that the average adult has an 18"-24" inch step, matting should be 8'-12' in length to be effective. These figures could be adjusted at the Elementary Schools where the average student's step may only be 10"-12". To work effectively the matting must be maintained. Generally vacuuming is the most effective method for removing deposited soils. Some facilities keep a spare set of matting, which allows maintenance on a revolving basis. The soiled matting is simply removed for service and the spare set put in its place.

Cleaning with Mops and Wringer Buckets

Using mops and wringer buckets for doing the floor cleaning and washing works quite well and has been the backbone of many maintenance programs for years. The issue is that to do it effectively often requires substantially more time and physical effort than doing it with an automatic scrubber. There are two important considerations in cleaning with mops and wringers. The cleaning solution should be changed as often as necessary to keep it as clean as possible. This helps avoid the problem of having the procedure spread and deposit more soil than it has removed. Secondly, and my impression is that the custodial staff is already on a good schedule, is performing the cleaning procedure on a consistent basis so that soils don't build up to a point where damp mopping simply can't handle the soil load. This is particularly important during winter months when tracked in dirt, sand and ice melting products can quickly build up to an overwhelming level. Getting floors clean is particularly important in maintenance programs that involve high speed burnishing. High speed burnishing procedures will actually imbed fine soils that haven't been removed, into the floor finish causing it to darken over time. If time constraints dictate that only washing or burnishing can be performed, washing should always take first priority.

Cleaning with Automatic Scrubbers

Obviously, the correct equipment can allow a smaller number of people to clean and maintain a facility much more effectively. Admittedly, purchasing automatic scrubbers for all of the schools would be a significant budgetary commitment. Automatic scrubbers can, however, be the single most effective tool for maintaining larger areas with a minimal number of staff. Use of a correctly functioning automatic scrubber would allow one staff member to clean the same area, more effectively than three or four people using mops and buckets. The biggest advantage offered by automatic scrubbers is that they apply cleaning solution, agitate it to remove soil, suspend it and completely vacuum it up, all in one operation. When functioning properly their ability to remove 99% of the cleaning solution from the floor allows them even to be used even during operating hours. For example, custodians could wash the corridors during the day when students are in classes.

This ability is particularly advantageous during the winter months when heavy soil conditions such as sand and ice-melting products can be very challenging to remove with a mop and bucket. In addition to routine cleaning procedures, Automatic Scrubbers can also be used in stripping procedures. They come in a variety of sizes that allow their use even in very tight quarters. Most are also self propelled so they are less fatiguing to use than a mop and bucket system. Perma doesn't manufacture or sell automatic scrubbers, so my enthusiasm for them is strictly based on my observation of their increased productivity and labor saving capabilities.

EQUIPMENT

Different pieces of equipment are designed to perform different functions and some types of equipment perform those functions better than others. I have already mentioned the advantages of cleaning with automatic scrubbers compared to mops and wringer buckets, but even within specific equipment categories some equipment works better for some purposes.

Wet Mops

Even wet mops come in a variety of materials and configurations that are fine-tuned to perform certain jobs. The standard cotton mop is still the preferred tool for damp mopping and washing when absorption and removal of soils is the goal. Cotton mops however come with cut or looped ends and in a range of weights. Cut end mops are generally less expensive and do a reasonably good job at general purpose cleaning. They do however tend to lint more, wear out faster and are not quite as good at retaining dirt as loop end mops. Loop end mops are a bit more expensive but for all the previously mentioned reasons are a better choice if the budget allows. Cotton mops are not the first choice for floor finish application. With the exception of some of the very fine strand "spaghetti mops", cotton mops absorb too much floor finish, don't release it to the floor as effectively, or provide for as good control of film thickness as the synthetic or combination floor finish mops. That isn't to say that a custodian with experience can't do a good job laying finish with a cotton mop but it's much easier with a finish mop.

Finish mops are constructed with combinations of nylon, rayon and sometimes cotton fibers. Again, they initially absorb less floor finish so you don't waste a quart in the mop. They then release the finish to the floor more consistently, allowing for more positive control of the thickness of the coat. They also tend to drag less and produce less foam during application than cotton mops. There have also been some

interesting developments in floor finish application systems. For example, new, synthetic micro-fiber flat mops can provide very fast, low foam finish application with less fatigue than standard string type mops.

Mop Buckets

There have even been some interesting developments in mop buckets. The traditional side-press and down-press wringers are still the industry standard. Side press wringers are less expensive but are more inclined to clog if they aren't maintained properly. They also are more likely to spray liquids out of the side than the down press wringers. In addition to being a messy, nuisance this can be a safety consideration if an alkaline stripper or degreaser is being used. Down press wringers cost a bit more but they are cleaner to use, clog less, and provide better control over the amount of liquid that is wrung out of both cotton and synthetic finish mops. Barring budget considerations they are the better choice.

There are new dual-bucket systems that offer some advantages particularly in cleaning operations. With these wringers the clean detergent solution is kept in one bucket. Following cleaning when the mop is wrung out, the dirty solution is deposited in the other bucket. Being able to always re-wet mops in the clean solution side reduces re-depositing dirt to a significant extent.

Machine Scubbing Pads

We also discussed the various types of floor machine pads available. They also are manufactured to perform different functions although there can be some crossover in applications. Most manufacturers adhere to the following color code:

Black - floor finish stripping/very heavy duty scrubbing

Brown - light floor finish stripping/heavy duty scrubbing

Green - medium duty cleaning

Blue - regular duty cleaning

Red - spray buffing/light duty cleaning

Most maintenance personnel are familiar with **black pads** and routinely use them for stripping or scrubbing heavily soiled areas. A variation on the standard black stripping pads are those that have been impregnated with carbide, like 3M's "Hi-Pro". These pads are thinner, have a more open weave and because of the carbide are noticeable more aggressive than the standard pads. These pads are particularly good at removing heavy build-up of floor finish or sealer.

Blue cleaning/scrubbing pads are probably the second most commonly used pads. They do an excellent job of removing ground-in soil from floor finish. They are the preferred pads to use when performing scrub and recoat procedures on floor finish. In addition to removing surface soils, blue pads are abrasive enough to remove small amounts of floor finish and the dirt that is embedded in it. This helps stop the finish from darkening and exposes new finish that responds better to burnishing procedures.

Red spray buffing pads are the third most commonly used pads. Although they are actually designed for low speed spray buffing procedures they are also commonly used for daily cleaning when floors are being maintained with an automatic scrubber. The reason is that they are abrasive enough to do a good job when used for routine/daily cleaning procedures, while not removing any of the existing finish.

Burnishing pads

Where you start to run into a large number of variations in color-coding is with high speed burnishing pads. Generally white or cream color pads are soft polishing pads. Tan, champagne, aqua etc., are somewhat more aggressive polishing/burnishing pads. The most aggressive polishing pads tend to be a combination of synthetic materials mixed with a natural fiber such as hog's hair or coconut fiber.

The softer pads can be used on any speed equipment but often work better with ultra-high-speed burnishing machines (2000+ Rpm). The higher speed equipment allows personnel to move faster and cover more ground, while still getting positive gloss enhancement. Slower speed equipment still works well, but requires more dwell time to get a noticeable increase in gloss. Softer pads also don't remove any

of the floor finish, which allows the base to be maintained or increased by scrubbing and recoating procedures. A consideration is that if floors aren't effectively cleaning prior to burnishing, dirt can become increasingly embedded into the finish causing it to darken over time.

The more aggressive, combination hog's hair burnishing pads can produce faster, more noticeable results than softer pads, with lower speed equipment (1000-2000 Rpm). They also tend to remove small amounts of finish removing embedded soil and exposing new finish. This obviously means that the finish base is slowly taken away requiring periodic recoating to maintain it. Also, care must be taken with ultra-high speed (2500+ Rpm) equipment not to overheat or grind through the existing finish with these pads. When used correctly, however, these are most often the pads that are used to produce the impressive levels of gloss that are seen in supermarkets and large chain stores.

Brushes

Another tool that can be very helpful in some situations are scrubbing and polishing brushes. They work particularly well on irregular surfaces such as ceramic tile, quarry tile, slate and other stone surfaces. They are also useful on particularly irregular, vinyl composition tile floors. They are available in a range of compositions that parallel the different uses of traditional scrubbing and burnishing pads.

CHEMICALS

Staying focused on a selected number of products allows maximizing the efficiency of a maintenance program. Application and maintenance information can be shared between facilities. Any issues encountered at one location can be compared to the performance and application environment at others. This approach also allows inventories to be managed more effectively. Excess inventory from one school can be transferred to at another or a school that runs short of a product during the middle of a maintenance procedure can borrow enough to complete the task, without concerns about compatibility.

Perma manufacturers over 100 different facilities maintenance chemicals and coatings. Again, even within the same product category different products as designed to provide different performance characteristics. This variety of products allows us to fine tune the performance of a program to address the specific concerns and achieve the results desired by a customer.

Floor Finish Strippers

Floor finish strippers can be divided into two basic categories of products. Alkaline strippers such as Perma's #105 Uncover, #115 Zip Strip, #117 Brut and #920 Start Over. These strippers will remove all of Perma's floor finishes and our most commonly used tile sealer, #19 Foundation. They are comprised of combinations of alkaline detergents such as sodium hydroxide, potassium hydroxide, sodium metasilicate. They also provide excellent results when used as a degreasers to clean both petroleum and protein-based greases and oils. When used a very low concentrations (1/2-2 ounces per gallon of water) they can also be used to make an alkaline pH general purpose cleaner. The cost effective price and high degree of flexibility inherent in these strippers can make them a good choice for programs in which there is a desire for one product to perform multiple functions. One consideration associated with these types of strippers is that at full concentration they are corrosive. This requires care and the use of appropriate safety equipment when handling the concentrate and higher concentrations of stripping solution. Also, the alkaline ingredients in these types of strippers can leave a residue that will negatively impact floor finishes so floors must be adequately rinsed prior to coatings. Alkaline strippers will also often not remove pure acrylics or urethane modified acrylics such as Perma's Landmark that are used as finishes on stone floors like slate or ceramic tile.

The second category of finish strippers are generally described as "no-rinse" strippers. This description generally indicates that the active ingredients consist primarily of water-soluble solvents that are designed to evaporate without leaving a residue that can adversely effect floor finishes or require rinsing. Although

these strippers have alkaline pHs they are generally not corrosive so they doesn't present the safety considerations that "alkaline" strippers do. Perma's Eliminator and NOSE are examples of this type of strippers. Both of these strippers will remove all of Perma's floor finishes and sealers including Landmark. They also more quickly dissolve heavy finish or sealer buildup. The primary considerations with these strippers are that they are somewhat more expensive to use, aren't as good as general purpose degreasers, and can't be used as general purpose cleaners because they have limited detergency and soil suspension properties.

Tile Sealers

I am often asked whether there is actually any difference between floor finishes and sealers and what a floor finish/sealer combination was? Floor finish/sealer combinations are usually floor finishes that have a high enough solids contents so that they fill in the pores in vinyl composition tile allowing for more rapid build than lower solids finishes. Perma's #25 Tuff Gloss, #30 Cutting Edge and #5@22% Perma Lock floor finishes can all be put in the category of sealer/finish.

Real tile sealers are actually different than floor finishes in that they are formulated with polymers that have a larger molecule size than those used to manufacture floor finishes. The larger molecules fill in the pores in tile more effectively. This provides more rapid build with fewer coats. Sealers also tend to have better adhesion characteristics to a wider range of flooring surfaces than finishes do. Sealers can provide a real advantage when used on older more porous tile.

#19 Foundation is a metal cross-linked, acrylic polymer sealer that is used as both a base coat for all of Perma's floor finishes and can also be used as a finish on hard surfaces such as ceramic tile, slate, marble, terrazzo, etc. Foundation has good gloss and durability, and can be removed with any of Perma's floor finish strippers. Foundation is generally completely removed during stripping and recoating procedures.

An alternative with slightly different performance characteristics is Perma's #20 Landmark. Landmark is a straight acrylic polymer (no metal cross-linking) modified with urethane. Landmark is a semi-permanent coating that can also be used as a sealer on VC tile or a finish on stone surfaces. The polymer used in Landmark was actually engineered for use on exterior concrete, so it provides superior performance compared to Foundation when used on stone surfaces. Landmark's polymer combination makes it more resistant to abrasion, wear and dulling by alkaline all-purpose cleaners. This allows it to be used in harsher, heavier soil environments like kitchens, storage areas, warehouses, light manufacturing, etc. It also is not removed by regular concentrations of floor finish strippers. This allows it to be used as a base-coat on resilient tile that will not be removed during routine stripping procedures. This makes it an excellent choice for stripping and re-coating programs, because it eliminates the need to re-seal each time. It can, however, be removed with Perma's #118 Eliminator if it becomes necessary.

Floor Finishes

#11 Lock Gloss is a 19% solids, urethane fortified, metal interlock combination polymer floor finish. Lock Gloss is the most versatile floor finish Perma manufactures. It is fairly hard finish, responds well to any speed buffing and burnishing, even up to 2500 Rpm propane burnishers. Lock Gloss's harder film allows small amounts of finish to be removed with a hog's hair pad, so fine scratches can be removed and the finish resurfaced making it ideal for high speed burnishing programs. It applies easily with minimal drag, levels well and dries positively even in hot, high humidity conditions. Whenever I am asked to recommend a high performance floor finish that is easy to use, I recommend Lock Gloss. Having said this, Lock Gloss also has some considerations. Its somewhat lower solids means it doesn't build as rapidly as a 25% finish like Tuff Gloss, so it requires more coats to achieve the same depth of appearance. 3 coats of Lock Gloss doesn't provide the same lay down gloss levels as 3 coats of Tuff Gloss. This is why they tend to be used in slightly different floor care programs.

The previously mentioned Tuff Gloss is a 25% solids, slightly softer finish that provides rapid build with high lay-down gloss levels. Although it responds well when burnished with 1500-2000 Rpm electric machines, it cannot take the heat and friction generated by UHS 2500+ or propane equipment. It is also more sensitive to high temperature and humidity conditions so it requires more time to dry than Lock

Gloss. Tuff Gloss's slightly softer film makes it less inclined to scratch than Lock Gloss. We find Tuff Gloss's most productive use to be in scrub and recoat programs where its rapid build and high gloss make it ideal for maintaining a positive appearance without routine burnishing or buffing.

This is a good example of two different finishes whose performance characteristics are designed to make them ideal in two slightly different maintenance programs.

Cleaners

Perma's #127 Tops neutral pH cleaner is an example of a high performance cleaning product specifically designed as a routine cleaner for resilient tile floor finishes. In an arena where most neutral cleaners are formulated to be low tech, low cost, commodity cleaners, Tops is actually a fairly sophisticated combination of synthetic liquid detergents, sequestering and chelating compounds. Liquid detergents are much less likely to leave a residue, allowing Tops to be described as "no-rinse cleaner". Chelating agents are compounds that bond to salt (chloride) molecules allowing them to solubilize ice-melting products. Sequestering agents are compounds that hold soils, oil, grease and ice melting products in suspension in the cleaning solution so they are less likely to be re-deposited on the floor. This makes Tops an ideal choice for use as a daily maintenance cleaner on any surface on which a water-based cleaner can be used, particularly in the severe conditions we encounter in the winter. Its low foaming formulation makes it an excellent choice for use in automatic scrubbers.

The next level up in cleaning ability, #129 Super Blue. Super Blue is at the highest quality level for general purpose cleaners. It also is formulated with liquid detergents, chelating and sequestering agents. It has a moderately alkaline pH so it is more effective at cleaning heavier concentrations of soils, oils and grease. It is very effective at cleaning commercial kitchen floors, range hoods, stainless steel, counter tops, walls, trim, concrete, ceramic tile, etc. It is the preferred cleaner for use in deep scrubbing and re-coating procedures.

Correctly Diluting Cleaning Chemicals

There is a vast, sometimes confusing array of systems designed to dispense chemical cleaning and maintenance products. Standard piston type dispensing pumps are one commonly used method to measure out various chemicals that are used in the maintenance programs. These types of pumps are cost effective, easy-to-use and when used correctly do a good job in controlling the use of chemical. A consideration with them is that they leave the dilution of the product in the hands of the person dispensing it. This requires that the individual mixing the product read the label, make a determination regarding the appropriate concentration for a particular task and then do the math to determine how much chemical to dilute with a given amount of water. This does allow maximum flexibility in making up a concentration of a cleaning chemical that will perform at the optimum level for a particular task. A potential issue is that when they are not measured and dispensed correctly, cleaning or stripping solutions can be under or over concentrated, so that they don't do the job or chemical is wasted.

A common way to address this issue is to dispense chemical using one of the various proportion control systems that are available. These systems are generally set to dispense a specified concentration of chemical automatically into quart trigger-sprayer bottles, wringer buckets or automatic scrubbers. An issue with some of these units is that the chemical dilutions are set are by the chemical manufacturer and cannot be changed to address varying needs. Also, some of the proportioning equipment will only accept a particular manufacturer's product and in some instances that product line can be very limited. The type of proportioning equipment we prefer and recommend are those are generic and can accept any standard container of any kind of concentrated product. This type can also generally have the dilution ratios adjusted to meet specific needs. Out of the plethora of equipment that is available, Perma has chosen Hydro Systems line of equipment as offering an excellent balance of cost effectiveness, flexibility, reliable operation and ease-of-use.

Effective maintenance programs are a process of considering and balancing a number of different and sometimes competing factors such as personnel, equipment, budgetary constraints, safety and regulatory

concerns and even political considerations within a system. Perma's focus has been to develop and evolve the experience and tools necessary to effectively assist school systems in managing these factors. Our resources are our customers resources.