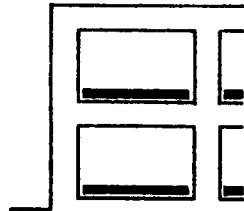


FLOORS

INTRODUCTION



The finished floor is a membrane attached to the surface of the floor or subfloor which provides a surface suitable for use by the occupants of the facility. It is the only subsystem with which there is universal and continuous contact by user as well as by fixed and movable furnishings and equipment.

The primary concern of this subsystem is durability throughout its useful life: unattached objects naturally gravitate to it, often with considerable impact; it bears heavy static loads of long duration and it must resist the abrasive action of user circulation; it must withstand the effects of high strength chemical agents and possible deteriorating effects emanating from the structural subfloor on which it rests; in addition to these required qualities of durability it should not inhibit activities which occur on it while remaining easily maintainable and aesthetically pleasing. The extent to which these requirements are met determines how well this subsystem performs.

Three materials were primarily used on the four schools studied: finished concrete with a poured plastic composition flooring, resilient tile and carpeting. Limited use applications such as quarry tile in kitchen areas and wood gymnasium floors are not included in this study.

METHOD OF EXAMINATION

Visual observation was the primary method of examination in all schools. Appropriate field tests in the areas of staining, slip resistance and scratch resistance were used. The equipment used to perform field tests was simple: a level, tape measure and small ruler graduated in 65ths of an inch. Cleaning and staining solutions were used where appropriate as was slip resistance apparatus. A camera was used to record examples of problems. For a more detailed description of the testing procedures used refer to the Field Tests Manual, 'Buildings In Use' Study, December 1974.

SUMMARY OF PERFORMANCE

	P	R	S	M
RESILIENT TILE				
Indentation/Impact	O	⊙	NA	NA
Resiliency	O	O	NA	NA
Brittleness/Cohesion/ Adhesion	O	O	NA	NA
Scratch/Wear	O	O	NA	NA
Slip Resistance	O	O	NA	NA
Cleanability/Dust	O	O	NA	NA
Water Absorption/ Delamination	O	O	NA	NA
Replacement/Repair	⊙	O	NA	NA
Cigarette Burn/Color	O	O	NA	NA

	P	R	S	M
CARPETING				
Indentation/Impact/ Resiliency	NA	NA	O	O
Adhesion	NA	NA	O	●
Wear	NA	NA	⊙	⊙
Static Discharge	NA	NA	O	O
Cleanability/Dust	NA	NA	O	O
Water Absorption/Stain/ Color Fastness	NA	NA	O	O
COMPOSITION FLOORING				
All Attributes	NA	NA	O	NA

SUMMARY OF FINDINGS

Performance levels of the various flooring materials used in each of the four schools studied was generally satisfactory with most functioning at the 85% performance level in terms of the overall characteristics of durability, maintainability and appearance.

A few instances of minor deterioration of the resilient tile flooring were found. Replacement tiles at Parkside do not match the original color and pattern.

The performance of carpeting in the area of durability was satisfactory (85%) with the exception of specific highly-trafficked locations. Some instances of fading, staining and seam tearing occurred at the Smith School (75%). The carpeting at Mt. Healthy, a relatively new facility was in superior condition (95%) with some minor wear problems. Advances in carpeting materials in the last 10 years may make a significant difference in performance. Recently installed carpeting is very superior in performance to earlier products.

DETAILS OF FINDINGS

RESILIENT TILE

RESILIENT TILE/INDENTATION, IMPACT

Results: Performance levels were satisfactory at the Parkside School (85%). Some instances of minor permanent indentation is present in the Richards School classrooms, with the resilient tile performing at the 85% level.

Probable cause: Long term static loads (e.g., table legs) have caused depressions in the floor tile at the Richards School. Short term static loads cause no permanent set.

Discussion: Resistance to long term loading is a key performance specification for resilient floor tile. At Richards, the tile used did not perform to required levels although in other respects it is performing well. Indentations found were in the 1/32"-1/64" range and visible from 5'. While this is not detrimental to activities or safety, it will probably tend to shorten the useful life of this finished floor.

RESILIENT TILE/RESILIENCY

Results: Performance levels were satisfactory at all schools.

Probable cause: Not applicable.

Discussion: Not applicable.

RESILIENT TILE/BRITTLENESS, COHESION, ADHESION

Results: Performance, in regard to brittleness, was acceptable (85% level) at Parkside and at Richards with specific instances of very minor problems. Performance, in regard to cohesion and adhesion, was satisfactory (95% level) at all schools.

Probable cause: Cracking due to tile bending over openings in the subsurface.

Discussion: Resilient tile is brittle and must not be subjected to excess bending. At two locations in the Richards School the tile has been subjected to bending and, as a result, has

cracked. One such location is the lower end of a ramped surface; the other is at the exterior wall. This latter condition is due to a portion of the tile resting on packed exterior wall insulation which is not able to support it.

At Parkside, resilient tile has cracked at expansion joints in the concrete subfloor which occur at the entrances to the classrooms. All of the instances at both schools are minor, being either too small to affect safety or in locations which do not bear traffic. It should be noted that these minor conditions often occur because of constructional procedures and their effect on the subsurface.

RESILIENT TILE/SCRATCH, WEAR

Results: Performance was acceptable at Parkside. A somewhat lower level of performance was judged to be found at Richards.

Probable cause: Unknown

Discussion: This is difficult to measure and in fact may be due to the color and pattern and not to actual 'in use' performance. However, the indentation found at Richards and not at Parkside (though Parkside is 4 years older) makes the Richards tile suspect as being somewhat 'softer'.

RESILIENT TILE/SLIP RESISTANCE

Results: Performance levels are satisfactory (85%) at the schools examined.

Probable cause: Not applicable.

Discussion: Not applicable.

RESILIENT TILE/CLEANABILITY, DUST ACCUMULATION

Results: Performance was very satisfactory (95% level) at both schools examined.

Probable cause: Not applicable.

RESILIENT TILE/WATER ABSORPTION, DELAMINATION

Results: Performance was very satisfactory (95% level) at both schools studied in these areas.

Probable cause: Not applicable.

Discussion: No evidence of damage due to water absorption was discovered, even in areas most susceptible. A waxed surface is used, and most liquids cannot penetrate such a surface.

RESILIENT TILE/REPLACEMENT, REPAIR

Results: Performance was satisfactory at Richards (95% level) but unacceptable (75% level) at Parkside.

Probable cause: An adequate supply of the original tile was not furnished for replacement and repair.

Discussion: The original tile pattern and thickness is no longer available. Although the need for replacements has been limited, they are evident because of the pattern and color differences (2 thicknesses of tile are used to make up the difference in depth). This has only an aesthetic effect, however, and is in no way detrimental to technical performance. An adequate supply of replacement tile (5-10% extra) should be available for the useful life of the floor.

RESILIENT TILE/CIGARETTE BURN, COLOR FASTNESS, COLOR HOMOGENEITY

Results: Performance was at a very high level (95%) in both schools.

Probable cause: Not applicable.

Discussion: Smoking is not allowed in either school. The tiles used were homogeneous and do not show wear easily. Color fastness, even in areas exposed to direct sunlight, is satisfactory.

CARPETING

CARPETING/INDENTATION, IMPACT, RESILIENCY

Results: Performance levels were acceptable (95%) at the Smith and Mount Healthy Schools.

Probable cause: Not applicable.

Discussion: Not applicable.

CARPETING/ADHESION

Results: Performance was satisfactory at Mount Healthy (95%). At Smith, classroom carpeting is unravelling at its seams (75%) in a significant number of instances.

Probable cause: Result of improper installation.

Discussion: Carpet seams are taped, rather than sewn, and in a few locations have torn loose. Wide bands of tape have been used to cover the ravelling and prevent further damage and this is readily apparant. This condition should be corrected.

CARPETING/WEAR

Results: Performance levels are adequate at Mount Healthy and in the classrooms at Smith (85%). Carpeting on the ramps is wearing excessively at Smith (below 75%). Carpeting on the nosings in highly trafficked stairs is showing wear at Mount Healthy after only 2 years.

Probable cause: A type of carpeting (indoor-outdoor) was specified which does not withstand the intense usage in the corridors. Nosings of stairs get very high wear.

Discussion: After some 7 years of intensive use, the carpeting at the Smith School shows excessive wear and will soon need to be replaced. The wear on the nosings of the Mount Healthy stairs is considerable taking into account the short period of use (2 years) but not unexpected. This area carpeting will need to be replaced considerably before the rest of the building's carpeting. Whether any carpeting will wear well on the nosing should be investigated. Carpeting on the 'big steps' at Mount Healthy is wearing well; however, the nosings on the ends of the steps which attracts most traffic shows early signs of wear and will need to be replaced before the rest of the carpeting.

CARPETING/STATIC DISCHARGE

Results: Performance levels were satisfactory at Mount Health and unsatisfactory (below 75% performance) at Smith.

Prabable cause: Accumulation of static electricity through walking. Discharge to metal.

Discussion: Nylon, the material specified for the Smith School carpet is one of the worst in terms of static discharge performance. This may not be a problem if humidity control (above 60%) were present; however, the HVAC system does not provide this control.

CARPETING/CLEANABILITY, DUST ACCUMULATION

Results: Performance was satisfactory at all schools using carpeting.

Probable cause: Not applicable

Discussion: Minute particles retained by carpeting are a source of excessive wear. No evidence of such problem exists in the schools studied probably due to the adequacy of the routine maintenance.

CARPETING/WATER ABSORBANCY, COLOR FASTNESS, STAIN

Results: Performance was generally satisfactory at the Smith and Mt. Healthy Schools. Any failures found are caused by undue outside forces. Some isolated fading is present at the Smith School.

Probable cause: Water penetration at the Mt. Healthy School has caused failure of the carpeting in one area. This carpeting has already been removed and was not examined in this project. Excessive staining of the ramp carpeting has occurred at the Smith School due to undue water penetration at the lower end of the sloped ramps. Color fading at the Smith School is very minor.

Discussion: The staining and the water absorbancy occurrences are the result of unusual and undue forces which this flooring is not made to resist. In terms of normally expected performance, especially in areas of potential problems (e.g., around classroom sinks) carpeting performed at quite satisfactory levels. For instance, carpeting below the cafeteria counter at Mount Healthy showed little staining. This most vulnerable spot indicates a high level of performance. The dark colors used and the presence of pattern also give positive effects in this area.

COMPOSITION FLOORING

COMPOSITION FLOORING/ALL ATTRIBUTES

Results: Performance was satisfactory for all characteristics of this material which was used in the heavily trafficked nodule areas of the Smith School. It is wearing very well and is well maintained. This is a clear finish and does show imperfections in the concrete structural floor.

Probable cause: Not applicable.

Discussion: The uneven coloring of the floor due to the finish of the structural floor below is consistent with the architect's intention in the design of a 'brutalist' building.