

## General Contractors and Owners Part ways on Playground Surfacing

Failure of a playing surface to meet standards and federal or state mandates could mean penalties, fines, liability and warranty repairs that could cost tens of thousands if not hundreds of thousands for an owner or the general contractor. Playground surfaces are highly technical and not generally understood by either prime contracting parties and failures of the system resulting in warranty claims might lead to the discovery that the system supplier;

accurate and complete with the suppliers and subcontractors understanding what is required. Sometimes the need on the part of the supplier/subcontractor to be low bid, the technical performance requirements of the main contract may not be in their work proposals. In many cases the product and performance required by the owner and that offered by the surface supplier are not one and the same and the General Contractor is left with the problem. In the past the GC relied on milestones such as substantial, total completion and the one year traditional warranty being the performance measures as the end of any responsibility for any aspect of the contract. This has all changed and the stakes can be very high and a risk that the GC is not or should not be prepared to take on.



As testing of surfaces in the field and longer performance warranties are put in place, the placing of a general contractor between the owner and the surfacing supplier can place both the general contractor and owner at financial risk, the child at risk of a life-threatening injury and the owner at risk for litigation fol-

No longer exists or has the financial wherewithal to affect the repair

The terms of the original contract and supplier subcontract are not the same

The prime contractor must engage a new supplier at full original cost to replace an entire surface

Most general contractors do not see themselves as taking unreasonable risks as they facilitate and coordinate all aspects of the project, including shuffling subcontractors and suppliers. They believe that the specification from the owner is technically

lowing an injury or complaint for non-compliance.

National and International playground surfacing standards have been in place since the early 1990's with field testing coming into prominence at the end of that decade and into the new century. This has been coupled with a greater awareness on the part of owners of risk to injury and mandates such as the ADA for compliance in the field, make the need for long-term functional performance even more important. Generally a playground protective surface is to provide for impact attenuation and in the case of accessibility will need to be firm, stable and predictable as to slope and changes in

level. There are a variety of surfacing materials available and all have technical production, installation and maintenance requirements that are best known to the manufacturer and supplier/installer.

Playground protective systems include sand, pea gravel, wood chips, engineered wood fibre (EWF), rubber chips, crumb and shreds, poured in place (PIP), rubber matting, artificial turf and plastic and rubber sheets and they all have variations in capital cost, maintenance cost and sophistication of installation and maintenance re-

quirements. Very often only the supplier and likely, but not always, the installer are familiar with the proper installation techniques and potential shortcomings of the particular surfacing system. This leaves the owner and any general contractors at the mercy of the supplier should the performance not meet the contract or standards requirements.

Many owners are beginning to stipulate significantly better performance requirements and best practices for the initial installation that are meant to result in long-term functional longevity. These specifications often require better performance than the minimums in the standards and many suppliers only provide for the minimum performance and if the field tests are not performed at the end of the installation and prior to use, the wrong system is accepted. Only through the use of test of the installed surface & all performance requirements can the owner be assured that the contract has been met.

Owners, knowing that the surfaces must comply during the entire service life of the playground, are using Standards such as ASTM F2479 section 11 for accessibility and section 14 to write warranty requirements that force the obligation of performance of the surface onto the contractor directly related to the owner through a prime contract. This approach places the cost of replacement or remediation of a surface on anyone other than the owner. For the owner this is a matter of taking the time and effort to write a comprehensive performance based specification and warranty and could save the owner tens of



thousands of dollars in the future. These mostly written out of financial need to succeed.

To better understand the issues related to long-term performance of playground surfaces it would be beneficial to discuss some of the properties of the surfaces already mentioned and how they can fail to perform and what the likely solution would be to a failure.

Sand and pea gravel can be excellent energy absorbers, but in most cases, unless selected to be clean and not able to compact, they fail impact attenuation fairly quickly. The failure of many owner of beaches is to install the playground directly on the beach only to find that the sand become easily compact and does not conform as a playground surface. Problems with these surfaces can also include that where they are installed in proximity to a PIP, tile or other synthetic, they contaminate that adjoining surface with the result of a premature failure. Essentially this is a naturally occurring inexpensive material that is likely to have more problems for the owner in the long run. With regard to accessibility, these materials as not suited to the task.

One piece of good news for purchasers of sand and pea gravel is that suppliers with “good” quality materials have submitted them for testing and can supply test results for compliance with ASTM F1292 from considerable drop heights. Many of them have also embraced the need for accessibility and offer options for accessible routes through their materials.

Woodchips and EWF are essentially wood products that are excellent energy absorbers and provide a certain degree of firmness and stability when installed correctly and maintained, but present significant maintenance problems where the surface disruption and changes in vertical level are concerned. Generally the EWF has the ability, when installed in layers not greater than 150mm (6") and compacted, to have a better performance with regard to the movement of the surface.

Loose recycled rubber has proven itself as an excellent energy absorber, while not demonstrating positive performance properties with regard to meeting all of the requirements of an accessible route. Although this material can provide excellent impact attenuating properties it is often installed to a minimum depth as a result of the cost of the material; however in high traffic areas the depth of the surface can be significantly reduced and the surface no longer performs as intended. As a result at least 50% more material should be installed than required to just establish a minimum impact performance for the playground drop height as established by the owner prior to purchase.

Poured In Place surfacing has become very popular as the accessible route as it can be installed to meet all the physical requirements for firmness, stability, slope and changes in vertical height; however many of these surfaces often fail the requirements for impact attenuation as a result of not being installed to an appropriate initial performance. Often surface are installed to have a critical height that is the same height as the fall height and changes quickly result in a failure as a result of not being appropriately installed or rapid changes during initial use. Generally UV stable binders are not used in the manufacture of the surface and after a very few years of exposure to the sun, the surface becomes rigid and fails. Alternatively there is contamination of the surface where there are other loose fill materials near or adjacent to the PIP with the result that smaller particles penetrate the surface and the ability of rubber granules to move in relation to one another is lost. PIP

also tends to have problems with shrinkage at the edges of seams in the surface or at the perimeter of the playground and should these gaps be greater than 12.7mm (1/2") the surface will fail the requirements of an accessible route. Since the PIP is one of the highest capital cost products that can be used in a playground, a failure will have significant consequences for the entity that will need to replace it. This is a critical problem for the owner/operator and potentially the General Contractor, particularly where the warranty is of 5, 8 or 10 year duration.

Drainage is a problem associated with all playground systems, however a PIP system manufactured with polyurethane binders can expand when exposed to prolonged submersion in water. This is of particular concern for impact attenuating surfacing that is now be required under ASTM F2461. Under certain conditions the surface expands and returns to its original condition, however it is more likely that the surface will swell and remain swollen. The only remedy will be replacement. Again a consideration for warranty requirements in wet or water-play areas.

Rubber Tiles or Mats are the agglomeration of rubber crumb and binder that is pressed to a fixed configuration in a controlled factory setting and should have more consistent performance properties than PIP, but these systems can also have problems associated with conformance to standards. Visually a Tile is a two part product





consisting of a smooth upper sheet with shaped legs on the underside. Although the rubber sheet does flex, it is the legs that provide the bulk of the impact attenuating properties. If dirt or other contamination is allowed to gather around the legs, either by penetration from the surface above or by sand or gravel where the Tiles are not installed on concrete or asphalt, the impact attenuation properties can quickly be lost. At this point there is a failure of the system. Additionally breakage of the legs over time can also cause a failure. Depending on how the Tiles have been installed or connected to one another, failed surfacing can be removed, corrective measures taken and the Tile replaced. This may or may not be at the expense of the owner or General Contractor as many tile manufacturers offer a warranty that does not extend beyond their loading dock or there is a limited warranty and the longer it has been installed, the less that warranty coverage is. This might be a problem for the General Contractor, where they have a 100% replacement built into their contract terms.

Additional problems associated with tiles is that their thickness is changed depending upon drop height of the play structures and gapping of the tiles as a result of changes in temperature or moisture. Varying the thickness of a Tile may require changes in the grade of the base under the tiles or a single thickness of tile is utilized for the entire playground, providing superior performance for low structures and marginal and potentially failing performance at high structures. This can be confirmed through testing in the field at the time of installation. With the gapping, a serious problem can occur where the gap may be larger than the 1/2" and there-

fore not meet the ADA or while the gap is open, dirt and other contamination can enter the gap and result in a location where the impact attenuation will not meet the required standards. Some manufacturers use metal clips to connect their Tiles, however when they do gap the metal clips become exposed to a child and a new hazard is created.

Artificial Turf is a relative new comer to the playground, but with a very successful history in sports and athletics. There are a number of suppliers of systems and with the "synthetic turf" carpet available to any contractor making a purchase similar to any flooring contractor, there will be significant-

ly varied performance and it is up to the owner to write performance specification not much different to the PIP and taking into consideration the potential problems that are unique to turf. Shifting infill depths have been a problem in sports fields and will also be a problem in the playground. Each owner should have clear maintenance instructions as diminished infill depth will have a bearing on the systems performance to ASTM F1292 and other performance requirements of the ADA both within and at the edges of the playground. Another issue specific to turf is the bonding and/or splitting at seams, which can become a maintenance headache and present a trip hazard. The issue of seams is more prevalent in the playgrounds due to the number of cuts in the carpet to accommodate the many posts of the play structures. Also unique to turf is the expansion and contraction of the materials as a result of temperature changes during the day with nylon shrinking with heat and polypropylene shrinking as it cools. Where the turf is not infilled to provide ballast or fastened at the edges, this can cause a "wrinkled" effect at different times of day or during the year. Generally the maintenance and repair of the artificial turf will require specialized skill and training as demonstrated by the recent growth in the market place of synthetic turf maintenance companies focused on the sport application.

There are other systems that have arrived on the market over the past 10 years that are hybrids of various systems. Some of these provide unique impact attenuation systems and upper layers exposed to the playground user that bring new and unique properties to the playground. It is important that the owner and GC alike assure themselves that the benefits and shortcomings are well discussed prior to installation and that for newer systems; the installation is performed by manufac-

turer trained crews. Warranties should also reflect the concerns of the owner over time.

The installation of a playground surface will be subject to performance standards that will need significant technical expertise that is proprietary to the supplier or installer of the system. The owner will be under federal and state mandates to conform to performance requirements that they can specify, but have no idea how to manage conformance. Their interest will be to write a specification which covers initial conformance and long-term requirements. These could be by itemizing the individual requirements or by just making a sweeping reference to the laws and standards they are subject to. These will be incorporated in the specification and warranty. Lastly the owner of a playground is working with a 12 to 18 year cycle for renewal of a playground and other than maintenance, has no intention of spending any additional funds during that time to meet their obligations. It is for this reason they write warranty terms and institute best practices.

One major problem for General Contractors and suppliers of surfaces is that they do not understand the standards and how they are incorporated into a specification or warranty. ASTM F1292, the only critical performance standard for surfacing, requires the “owner/operator” to stipulate the drop height for testing and also recommends that the “owner/operator” set lower values for Gmax and HIC than the 200 Gmax and 1000 HIC limits of the standards. Failure to pick up on these significant changes could cost the General Contractor or supplier.

A second problem related to the use of the ASTM F1292 comes in US States that require compliance with the CPSC Handbook for Public Playground Safety, will soon find that the requirement for critical height in the entire playground is the fall height of the highest play structure. They will catch most General Contractors and Suppliers unawares.

General Contractors are facilitators and not risk takers and for playground surfacing they are taking on massive risks that could place their financial survival in jeopardy. They should seriously consider taking on contracts that include

the installation of the play structures, the surrounding surfaces and the sub-base for the playground surface and ask the owner to contract directly with the supplier for the surface.

An option for both the owner and the General Contractor is to have the owner agree to the supplier of the surface and accept their warranty directly and likewise the surfacing supplier must agree with all of the terms of the contract including specification and warranty requirements.

The Owner and Supplier should have the relationship for the installation of the surface on a base and site prepared by the General Contractor. The downside for the owner is that they will have to write a stringent specification and warranty and most importantly select a supplier that has the financial strength to change a failed initial installation or failure during the warranty period. In any event it will not be the General Contractor’s DEEP Pockets they will be reaching into.



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