Evaluation of Surface Characteristics of Natural and Synthetic Athletic Fields

Chaloupka, Michael (Mac) (School: Christ the King Cathedral School)

Synthetic and natural turfgrass have been commonly used on athletic fields for a long time. One of the biggest concerns with synthetic turfgrass is the potential effect on players' health. It was wondered if natural fields or synthetic fields would have more variability when tested for surface hardness and temperature. The purpose of this project is to evaluate the surface characteristics of natural and synthetic turfgrass athletic fields. Different natural and synthetic turfgrass fields were tested across West Texas. Surface hardness and temperature were measured at predetermined locations on each field. Moisture content and percent green cover were measured for the natural fields, and infill depth was measured for the synthetic fields. Each measurement was taken three times at each spot. There were 15 locations spread across the athletic fields including high and low traffic areas. The hypothesis was supported. The natural turfgrass (n=12) had the most variability for surface hardness, which may reflect the importance of management practices for consistent playing conditions. The relationships between green cover, volumetric water content and surface hardness were highly variable among natural grass fields. This was most evident for volumetric water content as surface hardness generally decreased with increased moisture. The synthetic turfgrass (n=5) were more consistent with increased infill depth decreasing surface hardness. In summer months, the surface temperature increased by 27.3 degrees Celsius. Heat-related injuries are a major health concern for synthetic turfgrass fields. Continued research is needed as maintaining players' health remains the primary goal.

Awards Won: