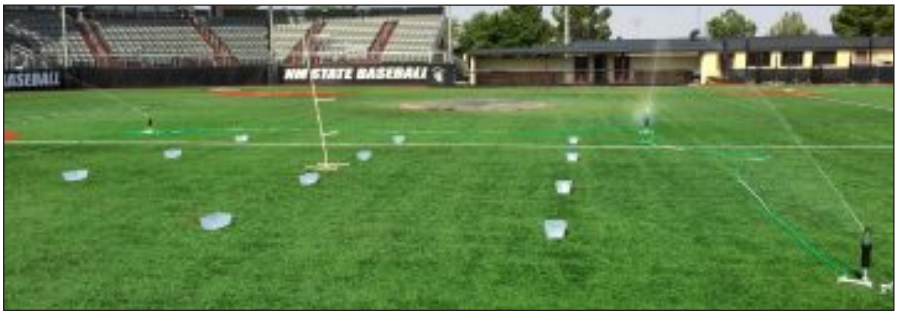
Artificial Turf vs. Real Grass

New Mexico State University study compares water usage



A section of New Mexico State's baseball field, which is artificial turf, was set up with catch cans to make sure the temporarily installed irrigation system reached the whole section equally while measurements were taken twice a day. (Bernd Leinauer photo)

New Mexico State University, Las Cruces, researchers wanted to figure out last year if artificial turf saves water compared to real grass.

Professor Bernd Leinauer (*leinauer@nmsu.edu*), a turf grass specialist, worked with Ph.D engineering student Ahmed Kanaan and Engineering Professor Igor Sevostianov (*igor@nmsu.edu*) to determine if a small equation could be used to calculate the answer to whether artificial turf uses less water than real grass.

In order to see if the model held true and if the numbers line up, the researchers, led by Kanaan, set up an experiment last summer on the artificial turf located on the infield of New Mexico State's baseball field. A parameter of 40-feet-by-40-feet was set up on the turf and a temporary irrigation system was installed.

"After I set everything up, I decided to run the irrigation system for 20 minutes to see how long it would take to heat back up," Kanaan says. "I took two readings each day, one in the morning and one at noon, just to see the distribution of temperature. The model I used calculated the amount of water required to cool the artificial turf correctly with an acceptable margin of error but there was no information on how long it takes for the field to heat up again."

Leinauer says Kanaan measured the surface temperature at one and two meters above the ground, so the heat buildup over the field could be seen. He adds the irrigation was turned on and cooled the turf and then Kanaan measured and documented how long it took to cool, when the artificial turf gets hot again and how long it took for that to happen.

Field Reaches High Temperatures

The researchers noted that artificial turf has been reported to reach temperatures as high as 180 degrees, making it a concern for the athletes that face the possibility of getting injured while playing on the field.

The researchers continued to question whether artificial turf needs less water than real grass as they acknowledge artificial turf can withstand more traffic from play compared to real grass that faces wear and tear and needs recovery time.

The results of the project showed that after the researchers irrigated for 20 minutes and in that time the artificial turf was cooled down to more or less body temperature, with the cooling lasting for about 60 minutes, Leinauer notes.

"It would be comfortable for any athlete but within an hour after irrigation we were up at the high temperature again," Kanaan says. "So, if we irrigated at the beginning of a soccer game, the cooling wouldn't even last the entire soccer game and then we're hot again."

Leinauer adds the study showed two cooling cycles require as much water as Bermudagrass requires in an entire day.

Not only would the artificial turf need to be irrigated multiple times a day to keep it cool, Kanaan notes anything surrounding the turf would also be impacted by the heat.

"The surrounding buildings and grass are going to get affected because of the reflection of the heat," Kanaan says. "I had Bermudagrass next to the artificial turf and the Bermudagrass increased in heat causing it to be damaged by the heat. When I would go to the field to get measurements, I could not stay on the ground to do it. I burnt the back of my neck and my wrists, but I had no other choice I needed to sit down there and get the measurements. When the heat reflected on to you, you cannot breathe."

Further Research

The New Mexico State researchers want to investigate the topic in more detail, citing the lack of literature on how much water different types of surfaces require.

"When we started looking for literature, we found many aspects of artificial turf discussed in literature, mostly economical ones," Sevostianov says. "But nobody considered aspects of watering and nobody compared it to natural grass.

"So, it definitely opens a lot of possibilities," Sevostianov continues. "We are definitely thinking about going deeper and asking for external support." ■

A project on a 40 by 40 foot site on New Mexico State's baseball field aimed to find out if artificial turf uses less water than real grass.(Ahmed Kanaan photo)