**KIBBIE DOME TURF ROLL-OUT AND ROLL-UP**

**Client:** Ed Schaper, Maintenance supervisor – Kibbie Dome

**Objective:** Improve the process of rolling out and rolling up the Kibbie Dome turf in order to reduce the effort and time required to prepare the surface for play while ensuring the safety of the players through proper positioning of the turf.

**Description:** The Kibbie Dome turf is composed of a series of strips that are individually unrolled to create the football playing surface (Figure 1). The unrolling procedure is time consuming (1 week to unroll and prepare) and difficult which makes quick turnarounds of the Kibbie Dome surface impossible. The unrolling procedure requires 4 workers: 1 forklift operator and 3 spotters. The forklift (Figure 2) carries the roll of turf while the 3 spotters provide direction to the forklift operator. Challenges include aligning adjacent pieces of turf, not stretching the turf, and communicating substantial information to the driver. The client wants some way to improve the turf preparation procedure to improve efficiency while maintaining the safety of the playing surface. Potential directions for the design are not limited to the following but include: addressing communication with the driver, improve the ability to unroll turf in a straight line, improve the process of rolling up the turf into straighter bundles, increase the precision of adjusting roll positions, or others. The student team will produce a scaled, functioning prototype that demonstrates the viability of their solution including a clear path to full sized implementation.

![Fig 1](image1.jpg) ![Fig. 2](image2.jpg)
PROCEDURE

Most important before starting to roll the turf out is to find the marks for putting down the first piece (50 yard line). They are heavy black marks on the dome floor and are located on what will be the east side of the 50 yard piece of turf, thus they will be to the east of center on the dome floor. Run a string line between the two marks, north and south. It is critical to get the 50 yard line piece down exactly on the string, no weaving.

Personnel needed to put the rolls down, include: fork lift driver, and 3 spotters. One spotter is used to look down the length of the carriage to keep it square to help prevent weaving, he helps the driver keep the wheels straight/ in line. One spotter is used to sight down the line of turf keeping it square from that perspective, and the third spotter crawls along as the roll is coming off and keeps the spacing between the piece of turf already down and the one coming off the roll tightly together, no more than ¼ inch gap maximum. The way the forklift carriage is designed, the forklift must go in reverse to lay the turf down. All rolls start on the south side and roll to the north. We normally set a bag of turf and the other smaller forklift on the end of the turf so it cannot slide or move when rolling out the turf roll. The spotters also have to keep an eye on the
carriage and tell the driver when he needs to lower or raise the spar so the roll is not dragging too much or is not too high and unrolling too fast. When steering cannot correct the alignment problem there is a small amount of play with the carriage. The brake has to be put on and the roll lifted and then either shifted left or right as needed, then set down and brake released to continue the rollout. Care must be taken not to pull too hard on the turf when backing up, so not to stretch the turf.

The roll-up starts with getting the blue pipes positioned so the turf roll is even along the entire pipe as you start to roll it up by hand for the first few wraps. If the roll is started crooked you can imagine what will happen as it gets bigger, it will have to be unrolled and start over again. Once the carriage/forklift is attached, and the spotters (2) have basically the same function again. No spotter is needed to check the gap on the rollup. The forklift goes forward and the spotters keep the roll square. The idea is to keep the edge of the roll as straight as possible, we do not want a concave on one end and protrusion of turf on the other end as this will make putting it down the next time much more difficult. It is important for the spotters to tell the driver when to lift the carriage to keep from bunching the turf roll and not getting it too high and making it too loose. If the carriage is too low as you approach the end the forklift tires are actually not getting enough traction and will spin making spots on the rubber dome floor. Once the rolls are up they are secured with two straps to prevent them from unrolling.