State Teachers' College Constructs Model Outdoor Classroom

The Willamette Valley in western Oregon is known worldwide for its ideal climate for growing turfgrass. Hundreds of thousands of acres of the valley are sown with bentgrass, ryegrass, tall fescue and fine fescue. These fields produce millions of pounds of seed each year for golf courses, parks, schools, highways, home lawns and stadiums.

Rich soil and steady winter rains make Oregon perfect for growing seed. But when those same turfgrasses are exposed to football in the fall, the result is often a muddy disaster.

Western Oregon State University in Monmouth is a state teachers' college with an enrollment of 3,900 located in the heart of the Willamette Valley. Each year hundreds of aspiring physical education instructors attend the university and participate in sports. To these students, the fields and stadium are more than places to exercise. They are the classrooms on which they base their knowledge of how sports programs should be managed. The standards for field conditions they encounter in college will follow the instructors throughout their teaching careers.

In 1986, the stadium playing surface had deteriorated to the point where it was necessary to limit the number of college football games that could be played on it each fall. This was further complicated and compounded by the university's longstanding agreement with the community to allow the local school district to use the field as well. After football season, the field was all but useless for other field sports and special events. Ongoing maintenance costs were high, and increasing every year.

Poor drainage and design could not be overcome through maintenance practices. The administration, determined to strengthen the university's position in teacher education, was equally set on improving the quality of its athletic facilities. Development of new technology in field construction provided a solution. Maintaining a natural field under high-rainfall, high-use conditions was achievable. The question remained, however: Was it affordable?

It was estimated that by using traditional resources, approximately three to five years would be required to complete the renovation project. It should be noted that in Oregon general fund money cannot be used to pay for athletic programs and facilities. When the detailed costs of the project were being reviewed by William D. Neifert, the dean of administration, and Peter Courtney, assistant to the president, the concept of combining this project with the replacement of the cinder track began to grow. In the fall of 1986, a decision was made to combine both projects.

The configuration for the new track required moving the existing stadium football field and its drainage system. This provided the catalyst which made the project cohesive—to make it one coordinated project.

The vision was complete. The next step was funding. Dean Neifert and Courtney began to work in the community, looking for any available donations. They also hired Ron Davies, a consultant with Arena Sports and Recreation in Vancouver, British Columbia, to design the complex.

A creative plan was reached. The college would fund a portion of the track/football field complex, lower some construction and installation costs by using in-house labor, and act as general contractor. The Athletic Department would provide volunteer labor. The Oregon State National Guard, Unit COB-1249, agreed to perform the surveying, heavy earth moving, grading, and light-pole removal portions of the project.

Once the funding had been arranged, Steve Miller, physical plant engineer, was selected as project manager. Excavation began in December, 1986, and continued through the winter under exceedingly inclement conditions. The project progressed, and by the spring of 1987 the site was beginning to take shape.

Davies' plan was based upon his experience in equally rainy British Columbia. The former 1,500-meter runner and track coach started designing all-weather track complexes in the 1970s. He could not understand why a sports facility would invest a significant amount of money in a track without also improving the condition of the infield. This heightened his interest in construction of rugby, soccer, and football fields.

He sought further information from personal contacts made during his track and field career. Through numerous letters and discussions with friends in Europe and the United States, Davies discovered that only a sand root zone could drain water from the surface fast enough to prevent damage

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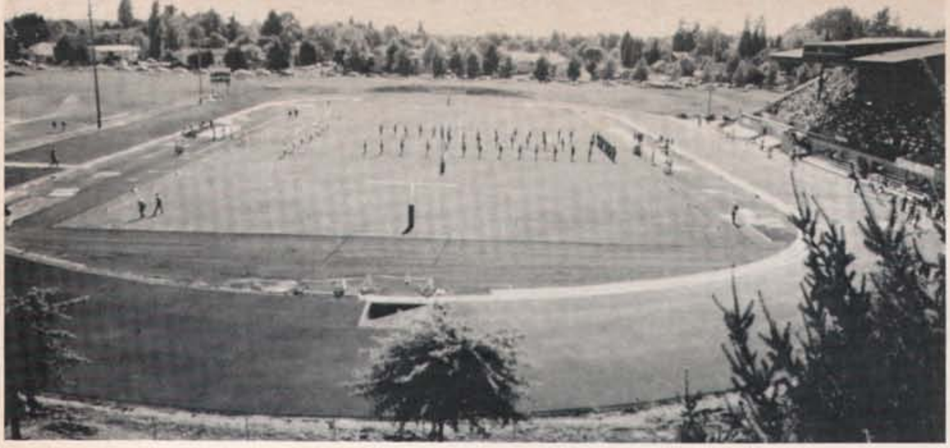
Sand is carefully laid over drainage/subirrigation network.



Stadium field and track following renovation.

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caused by wear and compaction.

The problem with sand is that it does not retain enough moisture for turf root growth unless water is trapped by a subsurface barrier. The key, he felt, lay in properly regulating the level of water below the surface. These were the principles Davies applied at Western Oregon, as he had many times before with fields on numerous continents.

The construction progressed in stages. First, the site was surveyed by the National Guard personnel. The engineering battalion brought in heavy earth-moving equipment. The operators, who were trained in building roads and bridges, excavated the old football field and cinder track. More than 18 inches of spoils were removed and spread on another field on campus.

After grading the subsoil, a gravel berm was installed around the perimeter of the football field. The berm serves a dual function. It is the outer wall for the sand basin and an interceptor for subsurface water outside the field. It does not extend above the surface. A loop of four-inch perforated drainpipe was installed at the base of the berm to carry water caught by the gravel out of the stadium.

The berm and flat subgrade were then lined with black plastic. Later two plastic partitions would be added to divide the basin into three sections from end to end. The drainage and subirrigation for each section could then be controlled separately.

Catch basins and manholes were constructed to connect the three drainage sectors of the field and interceptor system to the storm sewers. This was followed by installation of the main drain lines, electrical conduits, lines for the moisture sensors, the track timer control system, field phone plugins, and potable water outlets.

With all the utilities in place, the focus shifted to the field drainage and subirrigation system. A network of perforated drainpipe was laid in each of the three sections. The network consisted of a main line down the center of each section with drainpipe branching off in two directions every five feet. Each main was linked to the manholes on the side of the field.

After checking every joint in the drainage/subirrigation lines, the massive task of carefully covering the field with 18 inches of specially graded sand began. Starting in one endzone, they filled each section of the basin with sand, graded it, and hooked up the main to valves in the manholes.

Moisture sensors were placed at assigned depths in the sand and connected to the wires placed earlier. The sensors send an electrical signal to the valves at the water inlets, automatically opening or closing them based upon the level of water in the basin.

The subirrigation and drainage system came to life one section at a time. As the light brown sand turned dark with moisture from below, the university crew was anxious to start sowing the Futura Plus perennial ryegrass.

The controller was wired to the sensors in each of the three sectors of the field. During the irrigation season, the controller keeps the water level in the soil profile at the normal mark, which is determined by weather conditions. It is critical for the entire field profile not to become saturated. Otherwise the roots of the ryegrass would not grow deep enough.

If a sudden shower dumps too much water on the field, the controller automatically opens the drain valves, and the field drains to a normal level. During the winter months, the system is closed down and the drain valves are left in the open position.

Miller describes the field as "a bathtub with 18 inches of sand," in which the bottom two to six inches are kept saturated by either turning on the water or opening the drain plug. In the field, the plastic liner acts as the bathtub. The gridwork of perforated pipe either brings water into the field, or drains it as directed by the controller.

The field was seeded in early May 1987. This is where grounds superintendent Ron Cooper took over. Davies instructed Cooper on the special needs of his sand-based field. Cooper also consulted with Dr. Tom Cook at Oregon State University in Corvallis regarding fertilization. In September, the first game was played on the field. The track was completed later that fall.

To date, the field at Western Oregon State University has successfully withstood one complete and one partial football season. In the fall of 1988, approximately 27 games were played on the field without mudding up, slick surfaces, or appreciable wear. All in all, it has performed very well for Cooper and stadium groundskeeper Dave Bell.

The field is aerated and topdressed with sand in the late fall and late winter. At the end of spring semester, it is closed down and extensively renovated. This process consists of aeration (all plugs removed), dethatching, topdressing with sand, and overseeding.

Overseeding rates are 7-10 pounds per 1,000 square feet of turf-type perennial ryegrass. This year, Fiesta II will be used. Soil samples are taken once a year, and lime is added if needed. Calpril is used at a rate of 500 pounds per acre if called for.

The field is fertilized six times a year with 25-5-5 with micronutrients. Fifty percent of the formulation is sulphur-coated urea. It is mowed weekly, or twice weekly, with a Jacobsen HF-5 five-gang reel mower. The clippings are bagged with a Toro 217-D when needed, for aesthetic reasons.

In addition, a drainage and irrigation system for two full-sized practice fields is being completed. Four-inch perforated ADS drain tile was installed on 50-foot centers with rows of Toro 640 sprinklers over the top. A third, slightly smaller field has Hunter I-20s. This field was constructed on top of the spoils pile, and serves as an area for football sleds and machines. The entire complex can also be served with field pipe and irrigation guns when necessary. The facility is safe, high-quality, and aesthetically pleasing.

The single most important aspect of this project was the refusal of those involved to give up because of the initial cost. The innovative spirit that had been growing at Western brought about a planning team consisting of representatives not generally found in college projects. Members included academics, physical plant personnel, National Guard, Police Academy staff, architects, consultants, and a private supplier. Each representative had a need which was met and, collectively, $207,910 was saved by the institution on the construction phase of the project.

The annual maintenance costs on the completed project are projected to be $6,500 less than those prior to renovtion. In addition to these direct savings, it is anticipated that the facility will have a positive impact on student enrollment and booking of special events.

There are no athletic scholarships to attract students to Western Oregon State University. They make their decision on what college to attend based upon the quality of the curriculum and teaching facilities. Today this unique university has assured the growth and reputation of its athletic program, not by ticket sales, but by providing students with an appropriate learning environment. It's a refreshing change from the past. And it places the emphasis where it belongs, on teaching.