ELEVATION CHANGE

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Not every golf course site is the gently undulating land considered ideal for golf. But when a golf course architect is presented with extreme elevation change, how do they approach the design? Richard Humphreys finds out more.

t is rare now for a golf course architect to be given a site that would be deemed as perfectly suited to golf: the gently undulating land that is not so flat that it can't be drained, while not so steep that golfers can't make their way around it without steep uphill climbs or shots that career along slopes and into trouble.

Golf's increasing popularity over the years has seen the game move from the famous links of the UK that were considered ideal golfing land to inland sites that may require more manipulation, and eventually regions like deserts and mountains where golf course architects had to acquire new skills to lay out a playable and enjoyable golf course. An increasing focus on sustainability has required such skills to be developed further, as designers try to minimize their impact on

the land while also maximizing the commercial viability of the project.

Highs and lows

Brian Curley, ASGCA, has dealt with challenging sites throughout his career, particularly in Asia, where he has worked for over 30 years. "The good news is that most golfers love elevation change," he says, "as long as they are not walking it!

"My job is to create a playable experience that does not beat the golfer up with relentless difficulty. That is why the dirt-move stage is so important – you need to be right first time because adjustments can become a lot of work and be expensive."

Curley follows a trusted formula. "You always treat the natural grade



the same way," he says. "Modern earthmoving allows you to do crazy things, but you should always keep the concept that highs remain high, and lows remain low."

He says that the biggest issue with sites that have a lot of elevation change is that the slope continues beyond the site's boundaries. "The real difficulties are when boundaries are at the top of strong slopes," he says, explaining that the only way to turn a 25 percent slope at such a boundary into a 10 percent slope would be to create extremely harsh cut slopes that would look like cliff faces.

Curley believes that the key is to have a good understanding of the terrain and be willing to deviate from the norm. "Work the routings, look at options – such as reducing par and length – and focus on playability," he advises. "Do not be afraid of odd routings with back-to-back par threes, or other unusual sequences of holes."

At his Sun Hill design near Kunming in China, Curley had more than 250 meters of elevation change between the lower holes by Fuxian Lake to the upper holes on the mountainside. "Not a single 'natural' hole could be found," he says. "We had to create!" Major earthworking was required to create a good golf experience. "Many architects try to avoid moving dirt and the result is a course that is unplayable for most," says Curley, emphasizing the importance of commercial sustainability.

"I like to keep landing areas at a maximum cross-slope of 10 percent – anything more than that on firm

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Curley (pictured on site at Sun Hill) says it is important to get earthmoving right the first time, to avoid costly adjustments and create a playable and economically sustainable golf experience

conditions makes it difficult to stop a ball," he says, pointing out that catch bunkers can be helpful to keep balls in play.

Curley tries to find as many areas of existing terrain that would make for suitable landing areas. "This is best accomplished by dealing with the elevation change from golf holes than holes forced into the site. Eighteen great holes with an occasional path connection is a very tolerable solution, especially in climates with extreme heat and humidity.

"Do not be afraid to take a cart to 'get started' or to get back to the clubhouse. In the case of Sun Hill,

"Eighteen great holes with an occasional path connection is a very tolerable solution"

green to tee, not within the hole," he says. "I would rather have long green-to-tee connections and solid you take a cart under the road and up a hill to get to the first tee – this is no different than the fantastic Sand Hills in Nebraska, where you take a cart about three quarters of a mile from the clubhouse to the first tee."

Getting creative

Harrison Minchew, ASGCA, also learnt how to deal with slope in Asia, during his time with Arnold Palmer Design Company under the mentorship of ASGCA Past President Ed Seay. "I was able to hone the skill of creative hole routing and mass grading on 15 projects in Japan and two very steep sites in Taiwan during the 1980s and 90s," he says.

Minchew has since applied that experience in the US, too. In the



The fourth and fifth holes at RainDance National in Colorado play 60 and 75 feet downhill respectively

early 2000s he was part of the Palmer design team at Balsam Mountain Preserve in North Carolina and more recently, under his own name and in collaboration with PGA Tour Champions pro Fred Funk, he completed RainDance National in Colorado's Front Range.

"RainDance has 225 feet of elevation change from the high point, located on the first fairway, down to the low point – the lake along the fifteenth," says Minchew, who also references the work of George Thomas at Riviera and Bel-Air in California as examples of creative design to cope with the challenge of elevation change. "Golf architects have to use a combination of methods to create a great golf experience on sites that have significant elevation changes," says Minchew. "Routing holes to play along the slopes, avoiding holes that play directly down or up steep slopes and directing large cuts and fills to reduce an area's excessive slope are key to enable a golf architect to create playable and strategic holes, as well as beautiful vistas.

"To effectively combine creative routing and mass grading it is essential to have enough acreage," says Minchew. "Both RainDance and Balsam Mountain Preserve had ample space, which allowed me to avoid the steepest areas, and limit the amount of mass grading and the earthworks budget. I could route holes to meander parallel to slopes to minimize the elevation from tee to green, avoiding, as much as possible, playing directly down and up significant topography changes."

At RainDance, Minchew routed holes between the site's small canyons and down the slopes. "I was able to locate the longest holes playing more directly towards each nine's low point," he says. This has given rise to some extreme yardages too. The par-five thirteenth, which plays 120 feet downhill, is 778 yards. Clever routing has limited the uphill climbs, the steepest of which come



at the end of each nine; the ninth requiring a climb of 55 feet uphill and the eighteenth rising 60 feet.

Like Curley, Minchew also tries to ensure that much of a site's elevation is covered between holes. "From the seventeenth green to the eighteenth tee we go uphill 35 feet, and from eight to nine is around 40 feet," he says.

Maximizing views

"It's important to consider the site's natural features," says Kevin Atkinson, ASGCA, who has completed several projects where severe elevation change was a factor. "Distant views play a key role in the memorability of golf holes. Good holes are made great when you marry golf features with unbelievable scenery." Atkinson recalls a project in the 2000s at The Golf Club at Devils Tower in Hulett, Wyoming. The original nine-hole layout was on a relatively flat piece of property, and Atkinson was asked to design a new nine on adjacent land with some extreme routing challenges.

"There were spots where you literally can't get from the routing often comes together on how you can navigate around the site's natural features."

The biggest climb is from the tenth green to the eleventh tee, which involved getting up a rock face to holes located on a plateau. "Once golfers are on top of the rimrock, we have holes 11 to 17 that are very walkable with some fantastic

"Sometimes the power of Mother Nature is what designers need to pay attention to the most"

point A to B," he says. "There's around 40 feet of vertical rock ledge, so the site dictated that we work with what Mother Nature provided. In the Mountain West, views along the rock ledges. For instance, the par-three twelfth plays over and along a 150-foot rock ledge with Belle Fourche River below," says Atkinson.



The dramatic closing hole on the Highlands course at McLemore

"It's a dramatic change and I like routing a course to flow on a site with big elevation change providing golfers with an adventure through the property. The challenge was getting back to the bottom of the site, however!"

Part of the solution was the dramatic eighteenth, with the tee shot going over 100 feet downhill. Atkinson is currently working at The Club at Ravenna in Littleton, Colorado, where there is almost 500 feet of elevation change. He is reducing bunkers to both ease the demands of maintenance while also letting the natural environment shine.

"The course features were just a bit too strong, and everything seemed a little too much," says Atkinson. "We're softening some of that out because the property and mountainous setting is so dramatic and beautiful. Sometimes the power of Mother Nature is what designers need to pay attention to the most. My advice is to complement the beauty of the site rather than forcing your own will on it."

Creating space

"We focus on trying to create space for less-than-perfect shots," says Bill Bergin, ASGCA, of his work at mountainous sites.

Bergin has recently completed renovations on the Highlands course at McLemore Club in Rising Fawn, Georgia, alongside ASGCA Past President Rees Jones, and at Highlands Falls in North Carolina.

The par-four sixth at McLemore features a 140 foot drop. "We dealt with a blind second shot over the crest of a sharp hill, extending the fairway by 50 yards and widening left to improve visibility," he says. "The drive is playable, lessening the severity of the second shot going over the slope. At the bottom of the hill, we widened the landing area on the left side and elevated the green for better visibility.

"At Highlands Falls, we cleared more space, softened grades, improved drainage and reduced the impact of bunkers."

Bergin says that on both courses the views and the natural beauty are the main attraction. This is typified by the new closing hole at McLemore, which runs along a rocky cliff edge. "There is an element of excitement that players enjoy on these severe, yet stunning properties."