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June 2004

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TULIN AQUA RANGE AUSTRIA

Jeremy Pern, Golf Course Architect, explains how his outstanding Aqua range was built from an unlikely site.

Nitro-glycerine, Oil Refineries, American Bombers, Ecological Protection Zones, Concrete Production, Drinking Water Reserves, and Aqua Ranges make a strange mixture.

About 170 years ago transporting bulk goods on river barges was cheaper and easier than by horse and cart and so it was no surprise that a small industrial centre developed near the banks of the Danube about 40 km west of Vienna. By the beginning of the 20th century the area had grown into one of Austria's main chemical works and by the time the Second World War started an oil refinery and explosives production plant had taken pride of place in the industrial complex.

As allied forces move north in late 1944 the refinery came within bombing range of the American Air Force bases in Italy, and during October of that year over 25,000 tonnes of bombs were dropped destroying the entire complex. After salvaging scrap and bulldozing some of the ruins into mounds the site was simply abandoned and apart from a few

Opposite: An airial shot of the range in use.
Below: Jeremy Pern on site.

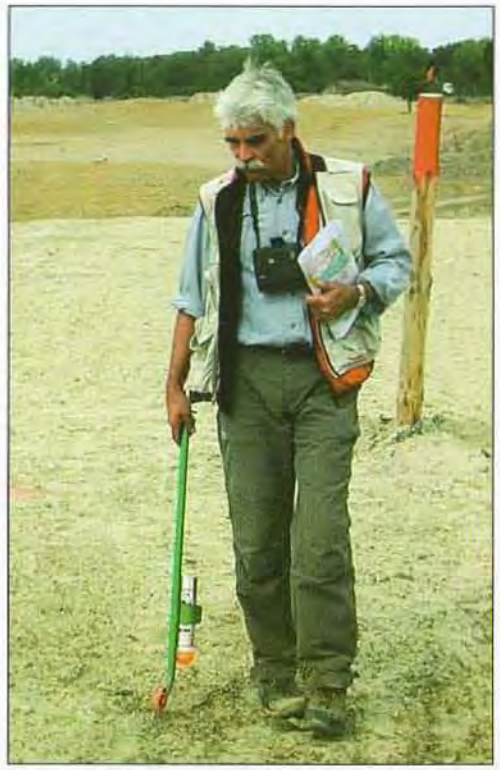
scattered sugar beet fields it became a wilderness of poplar, wild lilac and blackthorn.

As a result of mergers, buyouts and bankruptcy the ownership of the land changed over the years and by the 1990's it had ended up in the hands of a chemical fertiliser company based 20kms away.

In 1999, Alec Paul and his wife Dagi, a young couple who had developed a highly successful commercial golf business, decided to rent the land in order to create a flagship 36 hole golf complex and set about the planning permit process. I was brought in as golf course architect and together we set about defining objectives and establishing budgets and route plans. Planning procedures in Austria are broadly similar to the rest of Europe, a change of use 'outline permit' stage then progresses to detailed construction permission. The scheme had to go before many different planning departments for approvals - agriculture, environment, water, roads and services, buildings, and so on. As things advanced we realised that the situation was far more complex than we had first thought. The army had to check for unexploded bombs, the environmental department had to check for ground water pollution from the chemical works, and as the whole area had become a paradise for wildlife detailed environmental impact studies had to carried out for project approval.

The water table is only 50cms below ground level in this flat Danube flood plain, and under a thin layer of topsoil lay 15 metres of gravel on top of heavy clay. Over the years the region had become the main source of sand and gravel for the Viennese construction industry and dozens of abandoned gravel pits are scattered about the landscape. The long term development plan for the region was focussed on banning all aggregate extraction, creating protected areas for wild life along the banks of the Danube and to establish a drinking water extraction zone to safeguard the future drinking water supply for Vienna. We were initially very discouraged and wondered how on earth we could ever get permits to build the high profile golf complex that we wanted.

We decide to go to the planners to find out what they would really like to see



on the site, given that at that time it was a 100 hectare, bombed out industrial waste land. After several meetings the planners agreed that we could build lakes provided that we isolated them from the water table, and that we could build the golf courses if we made sure that no drainage water passed directly into the water table. We agreed to clear the site of all rubble and ruins, to create wetland habitat zones, to limit our irrigation water requirements to a minimum and to allow outside verification and control of ground water quality by the local water authority.

In exchange we were granted permission extract gravel to help defray the project costs. We proposed a vast lake complex of just under ten hectares which they accepted providing we could come up with a technical solution to the stringent environmental limitations imposed. Our major problem was how to isolate the water table from the lakes. By injecting liquid bentonite down 15 metres to the clay "bed rock" we created a water-tight barrier 2,5 kilometres long which surrounded the lake area. We then dug out 12,5 metres of gravel, pumped in water and lo and behold we had created what may be the most sophisticated golf aqua range in Europe.

The grassed teeing area is 20 metres wide by 150 long and has space for about 45 players. A few covered bays have been installed and will be increased as required over the next few years. A small chipping zone lies behind the tees. Our major problem at the design stage was to figure out a cheap and effective way of collecting the balls. We developed a few ideas for an automatic hydraulic system linked to the irrigation pumping station.

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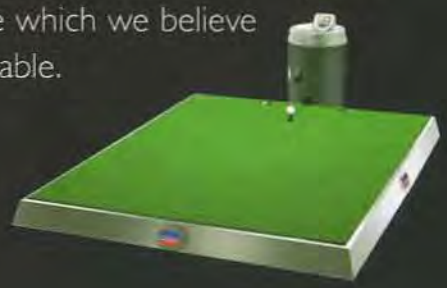

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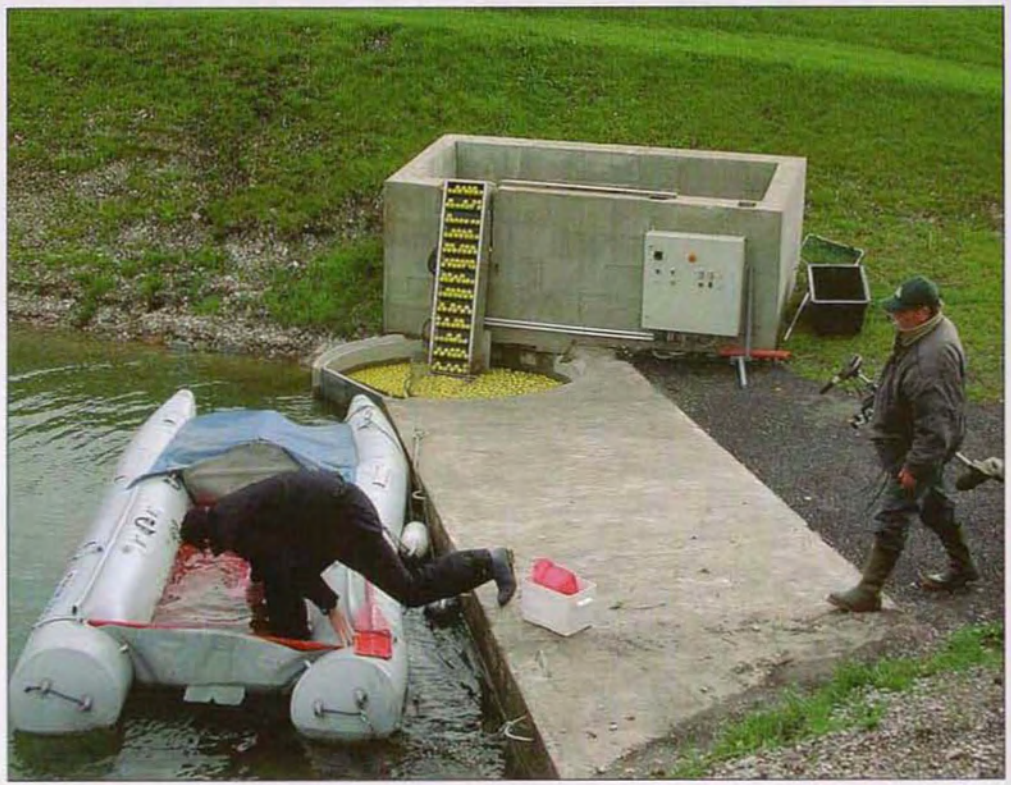

Above: The ball collection boat

But before we developed expensive prototypes we decide to see what would happen once the aqua range was operational.

The lake area immediately in front of the tees is about 250 m wide by 500 m long which means that all balls end up in the water and not on the fairways that run parallel to the lake edges. The success of the aqua range lies in its position and size. The lakes were designed along the line of the two prevailing winds (NE and SW). There are no sheltered areas on the lake, such as one might find on smaller ponds, and so all the balls get blown to one or other end of the lake The lake narrows down to about 15-20 metres at the end and a metal grid placed below the bridge enables balls to be collected "dry shod" from the bridge. There is very little vegetation around the edges of the lake and a "beach" of stones allows the balls that do end up on the banks to be easily collected.

The environmental and water quality restrictions imposed by the authorities included a ban on the use of petrol engines on the lakes. A battery powered electric outboard motor on an inflatable dingy completes the ball collection equipment for use on windless days. Collected balls are placed in a hopper beside the lake edge and are then blown up to the ball machine behind the teeing area.

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Compared to a conventional grass driving range of comparable size the aqua range has reduced ball collection equipment and labour costs, and has no irrigation water supply, mowing or fertiliser costs. Like all flat regions the site is quite windy but in calm periods balls may take a day or two to drift to collection points. This problem has been solved by having more balls in circulation than would normally be required. Initially I was concerned that golfers would be resistant to the idea of an aqua range, there are very few in existence. My main concern was how the golfers would react to not seeing where their balls ended up. In fact golfers seem to prefer to see where it lands, the splash in the water gives an excellent fix. As one cannot see floating balls from the tee, the aqua range always looks as if it is unused. This is a distinct aesthetic advantage over a grass driving range. Obviously the major drawback of an aqua range may lie in the initial construction cost, but in this case it largely paid for itself.

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Photos by Jeremy Pern© and Alex Kramer©

Below: Aerial view of the Tillin course and range

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