UK. Virtually no attempt had been made to carry the public along and get them on board. I can remember attending conferences on biotechnology in the early 1980s including GM where the only journalists were scientists from research publications and other ‘learned’ journals. The net result was blanket public distrust for GM in all its forms including grasses used in sports and amenity turf.

But many fears expressed about genetic modification of food crop plants, including members of the grass family – wheat, rice and maize – simply do not apply to sports turf because no human being is going to eat the genetically modified biomass. The only animals likely to do so are insect pests like chafer grubs, small wild mammals like rabbits and wild geese gazing greens and tees in spring for that early 19th-century feast.

However, there are factors presenting real or perceived environmental problems whether the GM plants are grown for human food and animal feed or used as a component of living sports surfaces. The grass had been designed for easy-to-manage establishment and spread than for agricultural crops like maize (an annual ‘grass’ albeit a very large one) which is replanted as seed every year. Others referred to numerous close relatives of A. stolonifera, like A. capillaris (colonial or browntop bentgrass), A. canina (velvet bentgrass), A. castellana (Highland bentgrass) and other truly wild bentgrasses with which it can hybridize and exchange the gene for glyphosate resistance. Research findings at the time reported hybridisation between creeping bentgrass (A. stolonifera) and other Agrostis species at frequencies of six hybrids thousand.

Others were concerned because the gene conferring glyphosate resistance did not originate from another green plant but from a bacterium. Be that as it may, an Agrostis stolonifera resistant to glyphosate herbicide becoming commercially available would have meant greenkeepers establishing pure stands on greens, tees and fairways which could then be sprayed with glyphosate to kill all ‘contaminating’ broadleaved weeds and rough grasses like timothy (Phleum pratense). Even other unwanted ‘fine’ turf species (e.g. Poa annua) would find their way into the sward one way or another.

The downside for greenkeepers would clearly have been the end of mixed turf grass species awards because anything other than the GM Agrostis stolonifera would be killed by the herbicide spray. Also grass clippings from the GM creeping bentgrass sprayed with glyphosate would be potentially toxic to other grasses and therefore requiring special handling and disposal.

GM grass pushes on
Further development of GM Agrostis stolonifera was blocked but this did not deter the manufacturer (the seed company Scotts of Marysville in Ohio State and now called ‘Scotts Miracle Gro’) which is testing a new genetically modified turf grass in garden lawns of a small number of its employees during this 2014 growing season. The employees are testing a Poa pratensis (Kentucky bluegrass) genetically modified to withstand glyphosate in the ‘Roundup’ product developed, manufactured and marketed by Monsanto.

In January 2014 the Columbus (Ohio) Gazette said ‘If no one beats Scotts to the market it will be the first producer of what it calls ‘enhanced turf grass’. Quoting Scott’s they said the grass (GM Poa pratensis) is designed to grow slower, require less mowing, be easy to keep weed free and to require a lot less water. GM turf grasses look set to make their mark in North America but obtaining approval in Europe and especially the UK may prove a much harder proposition. Not particularly due to scientific concerns in the EU, but general concerns articulated by the press and taken on board by broad swathes of the public.

Risk scenarios put forward against GM plant species are almost as varied as the gene transfer options offered to molecular biologists. Just imagine this invented scenario – ‘A bent grass (Agrostis) genetically modified for resistance to Fusarium Patch was approved and widely taken up by golf courses across the UK. The gene conferring resistance was sourced from rhubarb and scientists said the ‘rhubarb gene’ caused the cells of the GM grass to manufacture a chemical that isolated leaf infections by Microdochium roride. But the GM grass proved highly attractive to chafer grubs causing a population explosion and untold damage to golf courses throughout the country.’

Fines had a field day feeding on the chafer grubs but the chemical, transferred unaltered from chafer grubs to foen, made these urban wild animals highly aggressive with reports of attacks on people all over London and other towns and cities throughout the country. It clearly sounds contrived and is highly unlikely to happen but is just the sort of scenario bound to be used as an argument against, should development and approval of GM turf grass ever seem likely to happen in the UK.

The only animal likely to do was the chafer grub, a broadleaved weed or turf grass. They are broadleaved weeds and rough grasses like timothy (Phleum pratense). Even other unwanted ‘fine’ turf species (e.g. Poa annua) would find their way into the sward one way or another.

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Bad Vibrations

John Ross, former Course Manager and Master Greenkeeper, is now working to improve health and safety in the turf management industry. This month he turns his attention to the common ailment of Hand Arm Vibration Syndrome – which is actually classed as a disease.

The effects of vibration causing ill health and injury in the workplace are clearly understood. So much so that Hand Arm Vibration Syndrome (HAVS) has been listed as a prescribed disease in the UK since 1985 and is covered in RIDDOR2013(8) as being an occupational disease.

Its occurrence may be recorded by the person designated responsible for managing health and safety in the workplace and reported to the HSE.

So what is HAVS, how do we recognise it and how do we manage in order to prevent it?

HAVS is caused by the continuous use of vibrating machinery and affects nerves, muscles, joints and blood vessels. Symptoms appear in the vascular system which involves the tips of fingers going white (blanching), or the neurological system, which includes numbness and tingling of the fingers and a reduced sense of temperature or touch. Attacks in the early stages of the condition are not continuous and you do not have to be using vibrating equipment for the symptoms to manifest despite the fact they have been caused by that equipment, simply working in cold conditions is enough to trigger the symptoms.

When this occurs and the cold body subconsciously warms back up an exaggerated return blood flow can occur that will lead to a tugging of the fingers and the fingers going red and feeling extremely painful. HAVS will be incurred by conditions that have resulted in reduced blood circulation – and this includes activities which cause small blood vessels to narrow and can exacerbate the symptoms.

If exposure to vibration continues then the symptoms will spread further up the hand and can even affect the thumb, sufferers will experience joint pain (Carpel Tunnel Syndrome) reduced muscle strength and permanent nerve damage. In turf management the equipment that can lead to HAVS is hand held power tools and hand guided power tools. HAVS does not appear overnight, it is a chronic condition that studies have suggested may take up to ten years to develop. Once it has developed it is a chronic condition that cannot currently be cured.

Managing HAVS

Exposure to vibration is regulated, and these regulations place a duty on the employer to either eliminate vibration at source, or to lower exposure to as low as is reasonably practicably. What eliminate at source means is taking physical contact with the vibrating equipment out of the task (using a remote control) or do not undertake the task (it does that bank really need strimming?).

However where it cannot be eliminated (yes that bank does need strimming) eliminate at source means introduce organisational and technical procedures appropriate to the activity and to apply MHSWR1999 [4] The Principles of Prevention.

So what do the regulations say?

As vibration is a workplace hazard, any employer exposing their staff to vibration must conduct a vibration risk assessment. Like any risk assessment it is a tool that enables the manager to record what controls are in place, whether they are sufficient or not, and if any improvements needed. The risk assessment should determine who is exposed, the magnitude of exposure and the duration of exposure for all equipment. It should also identify vulnerable workers (those with early symptoms of HAVS) and young workers with developing bodies who are more susceptible to Musco Skeletal Disorder.

“You cannot manage what you cannot measure” is a well-known adage. Vibration can be measured because it is an oscillation around a fixed point and is measured like noise, in amplitude (the extent of oscillation) and frequency (how often it occurs). The measurement taken as factory new, and that equipment deteriorates, gets damaged, and is not always maintained as it should be.

In mechanical terms the measurement is expressed in Metres per second sq (M/S2), knowing that equipment out of the task but with the lowest exposure levels. It identifies what the symptoms are, and tell them to report to you immediately if any symptoms are experienced. The HSE calculator remains below 400. What is the best way of doing this using a points system introduced by the HSE. Points are awarded to a vibration magnitude per hour, if the points tally for the day reaches 100 you have reached the Exposure Action Value and must take action, if the point tally reaches 400 you have hit the Exposure Limit Value that exposure cannot exceed.

Using the HSE Vibration Exposure Points Calculator we can see that equipment with a vibration magnitude of 5 M/S2 can be used for eight hours before the ELY is reached 50X8=400 exposure points.

I know from experience as a Course Manager, that much equipment greenkeepers and groundsmen uses reaches the ELY, and some reaches the ELV, so we need to know what the duty of the employer is when those levels are reached. Those duties are shown in the table below (EAV):

<table>
<thead>
<tr>
<th>Magnitude</th>
<th>Frequency</th>
<th>Displacement</th>
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</table>

The amount of vibration you can be exposed to in a day, these are both measured over an eight hour working period so is referenced as (A8). Unlike the regulations for noise Personal Protective Equipment is given no consideration.

Those values are an EAV of 2.5 M/S2 (A8) and an ELV of 5 M/S2 (A8). The data for these levels is provided by the manufacturers of the equipment and is published within the operators’ manual. We must bear in mind that this is a measurement taken as factory new, and that equipment deteriorates, gets damaged, and is not always maintained as it should be.

The measurement provided by the manufacturer also does not consider wear and tear, service requirements, damaged parts, or blunt blades - all of which add to the vibration exposure. This means that any employer exposing employees to vibration also has a duty to measure to determine actual vibration values.

Once vibration levels are established it is easy to put in place procedures that keep exposure levels below the ELV, the easiest way is by providing clothing to protect from the cold and the damp. Implement a programme of health surveillance (this is important) and make sure that any equipment you use is registered by the HSE and what the symptoms are, and tell them to report to you immediately if any symptoms are experienced. The HSE calculator remains below 400.

When purchasing equipment you consider the vibration magnitude as part of your purchasing policy and buy the most suitable piece of equipment for the task but with the lowest exposure levels. It identifies what the symptoms are, and tell them to report to you immediately if any symptoms are experienced. The HSE calculator remains below 400.
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Working together

It is always an exciting time for any golf course architect to visit a new project, particularly one at an established members’ club. A club that calls on an architect’s services may be looking to improve its layout, the condition and presentation and, ultimately, the performance - financially and otherwise - of its course.

However, we are repeatedly faced with a club that has clearly made short-term decisions regarding improving the course - possibly due to several changes of commit-tees and the personnel within.

The president’s legacy and/or the captain’s mark are so often left behind long after they have departed, and become an integral part of the design of the golf course whether they are good or bad.

They then remain as an example of the personal involvement of the enthusiastic non-professional in the course.

This ‘Do It Yourself’ approach inevitably leads to wayward evolution of the course. There is far too much focus on tiny details because those making the decisions are simply too close to the action.

Getting things right in the way the course is redeveloped needs to be in the hands of the professional architect who can assess and evaluate the design of the golf course.

The professional greenkeeper can then take that assessment forward into a practical execution.

So, what is the plan at Stirling?

Stirling Golf Club has formed a Course Development Group to give the desired improvement works a sense of consistency over the ten-year period.

Autumn this year is likely to see the start of a woodland and lands-cape management programme to recreate the indigenous character of the course.

This will be accompanied by three of four holes being re bunk-ered in accordance with the overall plan.

A technical audit of the old irriga-tion system is going to be made and there will also be some modest field drainage improvements.

The renovation programme is then likely to consider the redesign of some greens and tees to improve the routing as well as more bunker- ing.

A holistic view

Moving on, it is vitally important that a holistic view is taken in any course at one point in time and from this analysis, made objectively by the architect, recommendations for its future development follow.

That holistic view needs to encompass:

The course’s overall design - its length, its balance, its rhythm, its flow, its variety, its challenge, the orientation of its holes, the variation from its flights of tees for the differ-ing standards of play.

The course’s safety - so often taken for granted, a problem may not be addressed until it is too late. You need to think about potential hazards on the margins of the course, and the proximity of the players on the course to each other when positioning greens and tees. Too close and you have a problem.

The performance of the greens - their shape, size, contour and the number of pin positions they have to spread wear and tear, their orientation to create an improved strategy of play, their entry and exit points, the featuring in their surrounds, their drainage, their bunkering.

The performance of the tees - their size to ensure that wear and tear is managed relative to the way the flights are played by members and visitors alike, their shape and their profile.

The performance of the bunkers - location, contribution to strategy, size and shape, play-ability, their technical performance in terms of drainage, both inter-nally and in the shedding of water externally, sand quality, colour, depth and, some would argue most importantly, their aesthetic value.

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In each of these considerations, the ongoing maintainability of the
not just endless planting exercises but balanced management, looking at areas around greens and tees to allow adequate air and light circulation. Planned and structured new planting of appropriate, indigenous species to enhance the landscape quality and character.

The resourcing of the greenkeeping effort and the accompanying presentation of the course - the shaping of greens to be consistent with the length of hole and the type of incoming shot. The framing of each green with collars and surrounds of increasingly graded heights of cut to ratios to maximise their differentials.

Hopefully, this type of exhaustive approach will provide any club with a blueprint for the future, by which the golf course might be operated. This should lead to the production of a comprehensive Course Policy Document.

James Lindsay, keen to see the course at Birling improved in the short-term and long-term, is looking forward to working with the golf course architect in a collaborative approach to the task in hand. However, no matter how good that approach might be, the membership need to be kept informed with the whole renovation programme.

So what is required from the greenkeeper to keep the membership on side?

Amongst other things - courage in your convictions, careful management to minimise disruption, information being given in the right form at the right time.

Above all - communication; from the architect and the greenkeeper. If this communication is unsuccessful, the membership will not be on board and it is doomed to failure without their support.

It has always been my view that helping the greenkeeping profession to understand more about what golf course architects strive to do and the basis upon which they try to do it will always bear fruit and over 25 years of design and renovation seminars and workshops at BTME has always been the intent.

Understanding more means a better result.
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This ensures speed of play is

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JUNE 2014

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ARCHITECTURE

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Choices, choices...

Natural hardwood signs or PVC timber signs? This used to be an easy decision: natural hardwood was chosen for its top quality image, whereas plastic was ideal where budget mattered more than presentation.

Then Eagle’s new Eagle-Plex arrived and its innovative chemical structure led many club and course managers to see a black-stained oak sign, whereas it was in fact Eagle’s new and realistic PVC timber material. We sort out the strengths and misconceptions in pursuit of clarity.

**Natural Timber**

**Presentation:**
Widely agreed to be the best material for a natural setting like a golf course, with a range of stains to suit different environments, e.g., links, heathland, parkland etc, has the edge when it comes to attracting sponsors looking for quality exposure.

**Design:**
Hardwood timber can be made to any design specification, and Eagle’s standard range is comprehensive. Bespoke requirements are encouraged as Eagle have their own machining and finishing plant.

**Substrate:**
The experience gained in operating and managing their own timber plant has led to the utilisation of Iroko hardwood – which has proved to be the most stable of timbers for all outdoor situations, well able to last 25 years even if in contact with the ground.

**Graphics:**
Natural timber signs looks great with all substrates, zinc, granite and aluminium. Engraved and paint-filled course information is also very distinctive.

**Maintenance:**
The Teknos two coat system has reduced maintenance needs dramatically. The Teknos base coat chemically impregnates the skin of the timber, forming a perfect base for the top, water-based coat, ensuring far longer lifetime.

**Eagle-Plex**

**Presentation:**
Eagle-Plex’s appearance is highly realistic with its ‘wood grained’ finish. Eagle-Plex signs and furniture are only available in black, but this still suits any course environment. Certainly good enough for sponsorship requirements.

**Design:**
PVC Timber has to be moulded, but Eagle have a large range of profiles available ensuring different sizes of sign frame which cannot be differentiated from old Oak.

**Substrate:**
The raw material is shredded and subjected to iron separation and made ready for injection moulding. The required volume of plastic material is poured into an Eagle mold and brought into the desired shape by hydraulic pressure to avoid warping. The results create super strong profiles ready for any environment, however harsh.

**Graphics:**
Like natural timber, Eagle-Plex works and looks great with aluminium plates. This option is not as size sensitive and therefore larger structures are very cost effective.

**Maintenance:**
None, other than ‘keep it clean’ with an occasional wipe with a damp cloth.

**Installation:**
Just make the holes for the posts and set them in concrete. All hardwood timber posts are sleeved with re-enforced plastic to maximise their protection.

**Sustainability:**
Genuinely sustainable hardwoods can only be sourced from certain licensed countries. Eagle takes great care that only officially licensed Iroko is used from forests where the trees that are cut down are being replaced accordingly.

**Cost:**
Due to the cost of sustainable hardwoods and the need for well equipped craftsmen to maximise the resulting furniture/signs’ appearance, the cost is higher than PVC timber.

**Installation:**
Eagle-Plex can simply be concreted into the ground and it will last forever.

**Sustainability:**
The Eagle-Plex product is 100% eco-friendly. Being chemically inert, Eagle-Plex signs cannot contaminate the environment in which they are utilised.

**Cost:**
As you’d expect, PVC Timber is significantly cheaper than natural hardwood, and with zero-cost maintenance, it’s ideal for those who want both presentation and cost-effectiveness.

Anything else?

**Guarantees**
Both products have the ‘Eagle Performance Guarantee’ which ensures all products are of the highest quality. Feel free to ask Eagle about their guarantees in relation to hardwood and Eagle-Plex signage.

**Take the Eagle signage test**
So, with all that to think about, do you think you know quality timber when you see it, or can you tell the difference between Eagle-Plex and black stained oak? In fact your best decision is simple: call Eagle on 01883 344 244, see both types of signage material for yourself, and make up your own mind as to which type best suits your own course and clubhouse signage needs.

Of course, Eagle’s team of experts will be happy to bring these samples round to your club, take you and your committee through their respective merits, put you in touch with other highly satisfied customers of Eagle in your area, and help you arrive at the best decision for your golf club and course.