



The KORO® Story



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Rip Up Or Rip Off?

Football pitches are frequently being ripped up, but Colin Rushbrook says refurbishment makes much more sense.

Over the next few weeks football clubs across the country will be surveying their pitches to determine how they have performed to date. Some football managers and players will even gang up on the groundsman and blame the state of the pitch for loss of those three valuable points. They will claim that all season long the grass was too long or slow or too bumpy.

For the small clubs with limited budgets, the only solution would be the usual end of season patch-up renovation. The larger clubs with more funds at their disposal will consider ripping up the pitch and starting again, but this "rip up" routine seems to be turning to "rip off".

For many years now, some agronomists have encouraged the replacement of the existing topsoil on pitches with what was hoped would prove to be a "fool proof" root-zone - one which would in theory perform the same in any stadium anywhere in the country.

Unfortunately this has not happened and the associated problems have been on display for all to see - some clubs have even had to cancel matches because of surface water.

The cost of such reconstructions will continue to spiral upwards as prices for plant machinery, manpower and transport costs rise. The new landfill tax will also make the cost of disposing vast tonnages of unwanted soil more expensive.

Personally, I believe we have taken things too far. Apart from a few exceptions we should learn to live with what we have got and get back to some good basic groundsmanship.

In May last year I became responsible for overseeing the refurbishment of Ipswich Town Football Club's Portman Road football pitch. The root-zone at the pitch was far from ideal prior to refurbishment, but it was judged by the STRI to be right 20 years ago and we managed to get it into shape to ensure that it will be right for many more years of play. After all root-zones do not change, they just get abused.

Root-zone abuse is generally brought about inadvertently. Some groundsmen need a good deal of time to understand the individual root-zone on their pitches and how it performs throughout the season.

Top dressing comprised of incorrect materials are often to blame - sands of the wrong particle size and shape that

will not marry with the root-zone, for example will make the surface unstable. In all cases, top-dressing should be matched to the root-zone. This will help to avoid problems such as root-break.

It is also important to make sure that the soil on any turf and turf tiles that are added to the pitch is compatible with what is already on the pitch.

Modern pop-up sprinkler systems can also play a destructive role, especially if they are not being correctly managed. Although they have the ability to deliver vast amounts of water over large areas, there are often overlapping points at which the grass is overwatered. This can create anaerobic conditions which if allowed to persist promote the unwanted growth of annual meadow grass.

It is important to remember that shady areas need less water and hot spots need more water. Those strange drying air currents often experienced in stadium situation should also be double checked. The habit of watering a pitch a few hours before kick-off is not suited to every pitch - percolation speed can vary and overwatering generally leads to overfertilising, as nutrients are leached through too quickly. This creates soft growth.

Today's groundsman has so much more going for him than those of yesteryear, thanks to advancement in the development of new dwarf perennial ryegrass cultivars. The Twin Towers mixture from Johnsons outperformed other brands when tested on the root-zone at Ipswich Town Football Club.

Unfortunately some groundsmen tend to sow swards far too thickly. This leaves little room for the sward to mature and realise its full potential. Although it is easy to lose your sense of better judgement when there are only eight weeks left until the season starts, keep in mind that it is far better to have one strong dense plant than 10 weak, spindly ones.

Upgraded equipment also makes life easier for groundsmen. With tools such as the Verti-drain and the Sisis Multislit and Technicore at their disposal, compaction is almost a thing of the past. These machines have the ability to penetrate the surface at varying depths with little or no disturbance, keeping the soil structure open and making it less likely for surface water to cause anaerobic conditions.

Turf Management 1997.

Take a leaf out of ko rodenberg's book and find out how you can obtain up to 650 hours annual play from a local authority football pitch.

When a pitch is constructed, the aim is to obtain a surface, which will take a minimum of 450 annual hours of play, even in bad conditions. By improving surface drainage, i.e. using the KORO® TOPDRAIN, the field durability can be upgraded to 650 annual playing hours.

Description of Annual Day-To-Day Maintenance On Our Football Pitches.

MOWING

On average twice a week, with ride on cylinder mowers (short grass disperse/digests better) mowing height 2 – 4cm depending on technical standards which play demands.

FERTILISING

Based on analysis, usually 125 - 150kg is spread on a pitch during the growing season, i.e. 3×50 kg applications in order to obtain a dense sward. Before over seeding phosphate is also applied.

AERATION

We alternate with two different slitters 5-6 times/year, to a depth of 10cm with a small machine and to a depth of 20cm with a big machine. Verti – draining only takes place when we have compaction below 20cm.

TOP DRESSING

Carried out in September and October prior to winter, usually 18 - 24mm of sand (180 - 250 micron) spread on to a pitch with a spinning disc spreader.

DRAGMATTING

We dragmat each pitch weekly with a specially designed 3 segment dragmat. This levels out minor surface imperfections.

ROLLING

Only carried out after frost

MOWMILLING/FRAISE MOWING

Carried out in spring and summer with FIELD TOPMAKER, with rear deflector fitted in order to level out the surface. Allowing grass to grow between each operation.

THATCH & WEED REMOVAL

With the FIELD TOPMAKER we can cut the thatch and weeds off the top layer direct into a trailer and remove from the site. This is carried out prior to over seeding. The pitch can be played on after eight weeks.

END OF SEASON

Depending on the amount of wear and use, we carry out, various operations on our pitches.

Mow grass as short as possible and sweep off, leaving a clean surface. Level up pitches with FIELD TOPMAKER, transporting removed material to composting site for re – use at a later date. Run RECYCLING DRESSER through the pitch to relieve compaction and bring up 80cu. m. of dressing onto surface. Collect dressings from wing areas and deposit into the low areas of goalmouth to build up surface. Use CULIT – ROLL in goalmouth areas to relieve compaction and mix up soil to a depth of 10cm. Afterwards work dressings back to level with SLEEPRAAM levelling harrows. The field is then over seeded in two or three directions with the 2mtr Vredo seeder.

On fields that have been TOPDRAINED, there is usually very little playing damage. We may run over with the FIELD TOPMAKER, set to 3 – 5mm deep to level up, then we verti – drain and over seed.

By using the KORO[®] RECYCLING DRESSER, no foreign soils, weeds or pests are brought into our pitches.

Selective weed killers are banned in Holland on playing fields. If we have a weed problem, these are removed and disposed of by using the FIELD TOPMAKER. If leaves are a problem these are removed from the surface of the pitch direct into a trailer with the FIELD TOPMAKER.

SWEEPING &/OR VERTICUTTING

Depending on the type of ball game being played or standard then this is carried out.

IRRIGATION

Only used on newly seeded areas if required. In a very dry period we irrigate to prevent playing damage.

MAINTENANCE OF DRAINS

This has a high priority; drains are jetted out and cleaned every three years.





PITCH RECONSTRUCTION

When pitches become totally unplayable, because of a number of contributing factors which can be either; -

- Drainage is not working.
- Structure of top layer not up to standards.
- Unequal top layer, which has to be levelled out.

This usually happens after 15 - 25 years of play and then we carry out the following operations; -

- Mow the grass as short as possible.
- Mulch the top surface to a depth of 20cm with the mulch plate fixed to the KORO® FIELD TOPMAKER.
- Use a spading machine to a depth of 20cm only.
- Level out the field using a laser fitted to a levelling blade.
- Spade the field again and laser level, to obtain better compaction.
- Install a piped drainage system up to a depth of 50cm, 4

 5 metres between centre. Drains 65mm diameter with polypropylene 700 covers.
- Back fill drains using sand of 400 microns up to 15 20 cm below surface and compact.





Soil that is removed from drainage trenches is spread out, if sub soil is not compatible, then you should remove it from site. Spade and level out the pitch up to 20cm to mix the soil with the sand and to fill up the drainage trenches.

Depending on conditions of the topsoil 400 – 800 cu. m of sand may be required.

Sub soil field to a depth of 40cm to alleviate compaction.

Mix the sand into the top layer by a combination of spading and rotavating. Drag the field level by using the KORO® SLEEPRAAM drag mat.

Apply fertilisers and then over seed using Vreedo type of drill seeder. Irrigate sparingly, only if needed.

Cut the grass to a height of 35mm when growth reaches 40mm. Brush grass to discourage disease after mowing on a regular basis.

Ko Rodenburg.

Sportsfield and Recreation Manager, City of Rotterdam

The Dutch Revolution

ARTICLE 1 – DATED 1999

By Carl Pass Director of Premier Pitches Ltd

We are all no doubt aware of the French and Russian revolutions and in fact our nations part in the industrial revolution. The revolution, I wish to refer to in this article, involves the little known Dutch revolution. The Oxford dictionary defines the word revolution in several ways and noticeably as ~ completely change or reconstruct. A definition, which I feel, is very apt for the ever-changing face of sports turf management particularly with regards to winter games pitches.

All aspects of sports turf management hold either particular benefits or disadvantages for instance in green keeping the majority of play is concentrated during the summer months, when the soil is active and the grass plant which it supports is functioning thus enabling regeneration. The disadvantage is that it is nigh on impossible to undertake any serious remedial work during the close season to say golf green, without causing considerable disruption.

In winter games pitch management we have the problems associated with play continuing through out the winter months when the soil is in a state of suspended animation and the grass plant for the main part remains in limited dormancy. Obvious problems then occur which can in turn lead to less than favourable playing conditions. The advantage of winter games pitch management is that we normally have a period during the close season to attempt to rectify faults and make improvements to hopefully carry the pitch through the rigours to come during the next season.

There is no doubt in my mind that stadium pitch managers whether they be in the premiership or the conference league would love to manage a dream pitch constructed to the state of the art standards that we see at the likes of West Ham or Derby County. This dream pitch would then be situated in a stadium designed on the lines of the Macalpine Stadium Huddersfield. Dream on; for the majority of clubs this dream will never become reality and they are forced to undertake limited improvements to the pitch as the stadium continues to create additional problems as it evolves.

Without exception the main protagonists causing problems to winter games pitches are poor drainage and the dreaded Poa Annua. No need to go into detail about the problems associated with poor drainage and the many systems available to rectify it. Most clubs have now addressed the problems associated with poor drainage and more often than not Poa Annua remains as the biggest hurdle in the battle to produce the perfect pitch.

Hear are just a few words commonly associated with Poa Annua. Thatch forming, week, unstable, shallow rooted, poor colour, susceptible to disease, susceptible to drought etc the list goes on. Some Groundsmen seem to have the knack when it comes to managing Poa Annua and work tirelessly to produce surfaces, which in the main perform reasonably well. Given the choice I am sure even they would rather be tending to a stand of healthy Perennial Rye Grass.

Let's now look at a situation familiar to all grounds managers. A wellconstructed pitch with a good drainage system which performs suitably for the first few seasons but then begins to fail to live up the expectations. This can often be attributed to Poa Annua. I have written on this subject in the past and waxed lyrical about the groundsman requiring an armoury of expertise and equipment to be at his disposal if a pitch is to succeed without reconstruction. It still goes without saying that the machinery and expertise are required but all to often clubs are unwilling to financially support the Groundsman. As such deterioration in standards occur and the vicious circle starts to rotate often culminating in expensive reconstruction work.

Views differ from person to person with regards to what polices should

be adopted to produce the best winter games playing surfaces. I personally have for a number of vears supported and continue to support the philosophy of a clean open sward with little or no organic build up. The theory behind this is if no thatch exists; air, light, water, and nutrients are all readily available to the grass plant. Being readily taken up by the plant anaerobic conditions are far less likely to appear and cause further problems, which we are all so familiar with. To achieve this type of situation on any pitch one must start at the beginning of the close season with a clean Perennial Rye Grass sward. During the season this may be nurtured without having to make compromises for additional Poa Annua infestations, which are often present in the majority of pitches. A lesson can be learnt from the cricket groundsman who decimates any existing grass cover during renovation prior to reestablishment with new seed. When the sward does establish it is clean and free from thatch accumulations, which cannot be tolerated if a quality pitch is to be produced. Often we sow top rated Rye grass seed into a thatchy Poa dominant winter games sward. How much of this expensive commodity actually survives to reach maturity. I suspect a large proportion either perishes in the thatch layer or is outcompeted by the ever spreading Poa Annua. Yet then another reason to sow into in to a clean root zone as the cricket groundsman does. Seed soil contact is paramount for good germination and establishment. After germination the young plants need the ability to tiller and mature, this will not be achieved if the seedlings are smothered with existing Poa Annua infestations.

So you ask what has the little known Dutch revolution mentioned at the top of the page got to do with all this. Manufacturers make claims that their new machine or concept will revolutionise the management of sports turf. Rarely do I become exited and enthusiastic about all the claims made. Some new concepts do indeed aid with the production of superior pitches if used correctly and as part of an integrated on going maintenance programme. There are however exceptions, one of which, the introduction of the Verti-Drain. This machine has over the years contributed so much to the sports turf management industry and is now so much part and parcel of any management programme that we would be lost without it. Other manufactures have come up with similar machines with other names but the word Verti-Drain has made such an impact that remains part of our vocabulary. The Verti-Drain has then become the first player in the Dutch Revolution

The next Dutch revolution I predict will come from the KORO® Range of Machinery introduced recently to the UK market. Last year I was privileged to visit Holland to see the range of equipment first hand and the results of its application. I also met Ko Rodenburgh the man with the vision to develop the equipment. The machinery was initially made to service the needs of local authority pitches in Rotterdam. The results have been outstanding. Along with others I was impressed by the achievements of Ko Rodenburg and the resultant quality of the pitches. The range of machinery includes the FIELDTOPMAKER[®], Recycling Top Dresser, Top Drainer, Speed Harrow and the Culti-roll. Obviously different situations require differing applications of the machinery either singularly or collectively. Briefly the machines perform the following functions.

The FIELDTOPMAKER® could be described as a high powered flail mower which has the ability to remove arising debris by means of a conveyor in to trailers for disposal. This machine can be used in different modes one of which the Dutch describe as "fraise" mowing. Fraise mowing is when the machine is set to remove only herbage from the top of the pitch. When the machine is in this mode its action grubs out shallow rooted Poa Annua and removes the entire plant along with any thatch accumulations. The top of the Rye Grass plant is also removed but the body of the plant remains intact thus allowing Re-growth to take place. In effect one pass of this

machine will far out way the benefits of continual scarification which many groundsmen undertake annually to remove Poa Annua and thatch which are associated with failing pitches. The machine can also be used to entirely remove the surface of the pitch effortlessly and in one operation. Once the process is complete the pitch may be re-cultivated or recycled with the Recycling Dresser and sown to Perennial Rye Grass ready for the season to come. This process will have an enormous impact on the majority of clubs who have no financial resources to undertake reconstruction but have succeeded in attaining a suitable degree of surface drainage. In subsequent seasons only fraise mowing will be required to grub out the majority of any Poa colonisation prior to renovation being undertaken in the conventional way.

The Recycling Dresser acts to excavate and re-distribute material from the root zone. Depth graduations can vary from 50mm to a depth of 200mm to suit conditions. The machine in effect removes a proportion of the root zone by means of coulters, it then decompacts aerates and re-distribute the material prior to its integration back into the rootzone by Speed Harrowing. This machine replaces the use of top dressings in certain situations thus making substantial cost savings by recycling existing material. Certain pitches will benefit from the recycling dresser. Pitches, which have been reconstructed using sand amelioration, will benefit from this process. Material can be excavated and redistributed fresh and aerated with the added benefit of any deep-seated compaction being removed by the process.

The Field Top Drainer acts in much the same way as a sand-slitting unit it does however it removes spoil prior to replacing it with sand. The sand is forced into the slit created by rotating culters thus creating a well-connected link to the drains below.

Several case scenarios exist where the KORO® machinery could be put to good use. These vary from the wellconstructed pitch, which is draining well but showing signs of damage by scaring or divotting, to the pitch that is in need of a total rejuvenation but the finances are not in place to undertake such work. Individuals would need to assess the type and amount of work required for their particular application. Even pitches showing no immediate signs of deterioration would in my opinion benefit from using the FIELDTOPMAKER[®] as the basic of end of season renovation to remove Poa Annua and thatch allowing the best possible start for the season to come.

You may be associated with one of the minority of clubs who have the vision and resources to create a state of the art pitch for the season 2000/2001. In which case you for the time being will have little use for the Dutch revolution apart from may be removing the surface of the old pitch with the FIELDTOPMAKER® prior to reconstruction. You could equally be one of the majority of clubs who for one reason or another must continue to improve your pitch as cost effectively as possible without the chance to reconstruct. In which case I would seriously look at employing one or all of the KORO® range of machines. I remain convinced that come this time next season you will be recommending to others that they consider the Dutch revolution as an alternative to standard renovation practices. By this time you will be looking back on reflection and wondering how you ever managed to produce a suitable pitch working with Poa Annua and all the associated problems it causes.

Of course the use of the Dutch revolution will not instantly produce a pitch which looks after its self. Attention must be paid to close season scarification, aeration, mowing, irrigation, fertilisation etc. All of which should be administered with a balanced approach. What the Dutch revolution will do is provide a level playing field from which to start on a relatively sensible budget. The rest is down to good common sense management and the financial backing from the club to allow this to occur.

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A new look at new problems

ARTICLE 2 – DATED 2000

By Carl Pass Director of Premier Pitches Ltd

Professional football pitch management is no longer about providing a surface, which will withstand the rigours of 90 minutes of football, any league groundsman will testify to this. Groundsmen now have the additional pressure of providing a surface that will be used for a pre match warm up which can last up to 30minutes. There are also half time activities including penalty shootouts, marching bands, dancers, and junior matches played across the pitch. If all this is not enough teams now insist on a warm down after the match which in many cases becomes a full blown training session for squad players not involved in the 90 minutes of action which has just gone. Success in European competitions brings additional burdens as travelling teams have access to the match pitch for training sessions on the day prior to the European tie being played. Other activities such as concerts etc. bring in much needed revenue to clubs who are in the business of making money by what ever means, to support their main objective which is to be successful on the pitch.

These activities are undertaken often in stadiums which have either evolved or worse still have been designed with no thought to the well being of the pitch, which at the end of the day is the one thing that is required for these activities to take place.

One answer to relieve the pressure facing stadium groundsmen would be to persuade clubs that the pitch should only be used for the duration of matches as they were in the past, this may have been voiced by individuals at some stage, I can imagine the answer from club officials. We as grounds managers must come to terms with the fact that this additional pressure will not go away. As unnecessary as it may appear to some, activities such as warm down sessions are undertaken for a reason and have evolved as part of a greater understanding of the requirements to produce a superior level of skill and fitness. As a consequence of this greater understanding we now see players performing at a much higher level when we watch a game of football.

So where does this leave the person entrusted with producing a surface, which will cater for all the needs of a club? It is my view that we must take a positive attitude with regard to the situation. Things will not change, clubs will not reduce the height of stands to reduce the impact of shade, nor will they open up corners of the stadium to allow more air movement or reduce the amount of additional activity on the pitch during match days and in the close season.

Stadium pitches generally have improved tremendously over the last ten years, which is a credit to all involved from Groundsmen to researchers and machinery manufacturers. Groundsmen now face a new challenge involving the additional pressures mentioned above. Problems with weather during the winter months are well documented and this has been addressed by most clubs who now have efficient drainage systems that will remove large amounts of water effectively so that they have a reasonable playing surface, which will withstand 90 minutes of football. Will this surface withstand the new set of problems placed upon it?

Although I do not pretend to hold all the answers to these increasing burdens I am, in this article, trying to formulate a plan of action that will go some way to producing a pitch able to withstand the new challenges posed by increased usage and stadium problems.

In my view one thing that contributes to the solution is a clean open sward clear of Poa Annua. A thick dense sward is often viewed by many as an essential component when producing winter games pitches, however I would argue that a thick dense sward creates its own set of problems as the majority of pitches which appear to have a dense sward are dominated by Poa Annua which produces thatch.

To attempt to create a suitable playing surface the following problems must be looked at in detail.

Problem - Surface divots, thatch and surface stability.

Firstly what is a divot and how does divotting occur. Divots are produced when a players boot makes moving contact with the surface of the pitch. separating the grass plant and accumulated thatch from the root zone leaving an area devoid of grass cover. Divots can be replaced to cover the exposed area but in the winter months the roots will not regrow and the cycle repeats itself. If a sward is open and supporting healthy Rye Grass plants without thatch, divots to a large extent cannot occur. The grass will only scar, meaning that the grass is moved within the rootzone rather than removed. Scarring can be repaired as the root is still intact and will recover more effectively.

Surface stability is often affected on a thatchy pitch by the addition of bulky top dressings such as sand and root zone. When it is applied in the close season the top dressing just sits on the top of the thatch rather than integrating into the rootzone, causing instability. To solve this the thatch must be removed prior to the application of the bulky top dressing.

Problem - Regeneration in shade and lack of atmospheric air movement.

The impact of shade and impeded air circulation will affect the characteristics of a pitch. Higher stands and wrap around stadiums will severely impede the ingress of vital air and light, as a consequence grass will struggle to grow. Regeneration will be even more hampered if the small amounts of light and air present can not be absorbed by the plant due to thatch accumulation.



Problem - Migration of fines within the root zone, black layer, irrigation and nutrition.

Over time some pitches will inevitably suffer from finer particles within the root zone migrating to the surface, this impedes drainage rates and can lead to layering within the rootzone which affects surface stability and causes shallow rooting.

Anaerobic black layer is associated with stadium pitch problems it can be problematic in even the best maintained pitches. This can be kept at bay by regular aeration practices being undertaken at the correct time of year.

Finally the nutrition and irrigation which is required to produce the desired playing surface can often be inappropriately administered. Players, managers and club officials all wish to see a pitch, which is green and well presented, this sometimes puts pressure on the groundsman to over fertilise and water. Poa dominant pitches will look impressive in the early part of the season with their thick lush sward, unfortunately when it comes to the depths of winter they often fail to live up to expectations.

There are many factors to take into account, however if a pitch made up of an open Rye Grass sward, free of thatch and Poa Annua, growing in a suitable root zone, can be established then a number of the aforementioned problems will be eradicated.

How is such a pitch produced?

In agriculture farmers have for centuries cultivated land as part of its on going management. Surface cultivation by whatever form stirs up the soil, decompacts, aerates and refreshes the soil. Often this management is undertaken in a cyclical pattern between crops, this cycle of cultivation keeps the land conditioned and able to sustain whatever crop is to be grown. The "crop" sports turf managers produce is obviously grass.

Historically managers of sports turf pitches have not had the opportunity to undertake surface cultivation mainly because of the cost involved in removing the existing sward and the fear of insufficient recovery time due to playing seasons starting earlier and finishing later. Subsequently sub surface cultivation has been the only option available to aerate and decompact. All practices associated with sub surface cultivation are designed to minimise disturbance to the existing sward. We now however have the ability to remove existing swards efficiently and economically by employing the KORO® FIELDTOPMAKER[®].

Surface cultivation is based on the assumption that, a reasonable root zone exists with the ability to sustain healthy growth and remove precipitation efficiently. Prior to any surface cultivation, pitches must be evaluated it should not be assumed that surface cultivation is suitable for all pitches, for example your pitch may have a bypass drainage system which could be damaged by surface cultivation, however in this instance thatch and Poa Annua can still be removed by the KORO® FIELDTOPMAKER® and the KORO® Recycling Dresser can also be used without disruption to the bypass drainage system.

My suggested plan of action is centred around a cyclical programme and as such would commence in the close season by using the KORO® FIELDTOPMAKER® to remove all existing accumulations of herbage and thatch (removal of the top should not be confused with fraise mowing). Cultivation would then be necessary to redistribute any fines, which may have worked their way to the surface. Air will be introduced to the profile of the root zone by cultivation; any problems associated with anaerobic conditions such as black layer will be addressed at this stage. During cultivation soil conditioners such as seaweed meal etc can be added, as they will be well integrated into the root zone. An opportunity also exists to introduce fibre stabilisation, which will enhance the playing characteristics by reinforcing the root zone. Fibre stabilisation is the ideal method for this system as it will benefit from

periodic surface cultivation and remain unaffected through out the cycle of operations. Once this work has been completed the pitch may be levelled to an acceptable standard. Overseeding using suitable equipment should follow using only Dwarf Perennial Ryegrass seed sown at the recommended rate, do not fall into the trap of adding three or four bags for luck and one more for the pigeons. Pre-seeder fertiliser should then be applied in accordance with soil analysis.

Once the sward starts to establish correct management practices can be undertaken such as irrigation, aeration, fertilisation etc. These practices should be carried out for the purpose of producing a healthy deep-rooted sward able to withstand the rigours of the season to come. During the first season the pitch should perform well given the correct management. At the end of the season hopefully the pitch will have coped with the increased demands far better than it may have done previously due to the removal of thatch forming Poa Annua.

To prevent the re-formation of Poa Annua, during the close season in the second year it will again be necessary to employ the KORO[®] FIELDTOPMAKER[®]. This time the machine should be used to fraise mow the pitch. This operation will clear out any unwanted organic accumulations and grub out Poa Annua colonies. Perennial Rye Grass plants will remain largely unaffected by this operation and will regenerate within a short period of time. If appropriate the KORO[®] Recycling Dresser can be used to good effect, this machine will aerate decompact and provide a source of top dressing all in one pass.

At this stage any necessary bulky top dressing operations can be undertaken such as sand application, prior to Verti-Draining/solid tining, with the confidence that they will be integrated into the root zone rather than sitting on top of an organic layer. Overseeding at the recommended rate should follow; the seed will reap the benefit of having excellent contact with the soil thus making germination and subsequent establishment far superior to seed sown into a thatch layer.

As the second season approaches it will become crucial that attention is given to aeration throughout the growing season to minimise the occurrence of anaerobic conditions. Although the KORO® FIELDTOPMAKER® will have thoroughly cleaned the surface one can not afford to be complacent and as such scarification and verti-cutting will be necessary to keep the sward open and free of any unwanted organic build up which may affect the performance characteristics of the pitch. Verticutting will also assist in preventing the sward from becoming woolly, which could lead to disease infestations etc.

A close inspection and evaluation will be required towards the end of the second season. If the pitch is in a similar condition to last year it may be that a repeat of operation undertaken during the end of the first season will suffice to see the pitch through to the end of the third season. If this is the case all well and good. a little adjustment to renovation may be necessary to redress any small problems, if the KORO[®] Recycling Dresser was not used last season it may well be worth using it this close season. On the other hand if it appears that problems are reoccuring (which may happen in certain Stadiums) to such a degree that it will affect the development of a clean open sward then the work prescribed for the first season can be undertaken again.

This system of pitch management is intended to reduce many of the factors that can be attributed to stadium pitch problems. Due to the availability of new machinery handled by competent operators, surface cultivation and other operations can be undertaken cost effectively and when necessary thus eliminating the need for costly removal and replacement of the rootzone.

A pitch battle - waging war on poa annua

ARTICLE 3 – DATED 2002

By Carl Pass Director of Premier Pitches Ltd

Sometime ago I wrote an article entitled the Dutch Revolution that looked at the then, relatively new concept of the KORO[®] range of machinery developed in Holland. Within the article I predicted that the FIELDTOPMAKER[®] would become a regular part of our armoury of machinery used in the battle to, one day, produce the perfect natural turf pitch. This was followed up by a further article looking at the new set of problems faced by league groundsmen and how best to address them by using the KORO® range of machinery as part of an integrated management programme.

Time has now passed and we have had the chance to assess the effects of the 'Dutch Revolution'. There is now the generic term used by some in our vocabulary, 'KORO®ing' which describes the use of the FIELDTOPMAKER[®]. It should be noted that the FIELDTOPMAKER® is only one of a range of machines available from the company. The FTM and other machines have all been designed to work in harmony in different situations.

As with any new concept or idea, things need time to develop and evolve, people are by nature cautious and often reluctant to change their ways and methods. This has been the case with the KORO[®] range of machinery. Whilst the more progressive consultants and groundsmen saw the potential immediately others chose to monitor the situation to see how it progressed. I would suggest that those who undertook work using the KORO® FIELDTOPMAKER® have not rearetted the decision. on the whole if the work was undertaken correctly a high percentage of Poa Annua and all associated thatch will have been eradicated from their swards.

Now we have experience of the use

of this machine, particularly in stadium environments, we can better understand its effects and the results of its use. As such I would like to look at some of the effects which need to be addressed if sports turf mangers are to fully understand the impact of its application.

Reduction in thatch and Poa Annua

Many will now be familiar with the term fraise mowing which describes using the FIELDTOPMAKER® to remove organic debris and shallow rooted Poa Annua leaving the Rye Grass plants roots and growing eye intact. Fraise mowing, in its pure form, can only be achieved if a sward is dominated by Perennial Rye Grass. Pitches, which have not been subjected to the use of the FTM and are heavily infested with thatch and Poa Annua, will not successfully fraise mow. In the first instant these pitches will require what could be described as fraise topping. Fraise topping refers to the total removal of all herbage and a degree of the existing soil. Once fraise topping is complete the pitch will be in a similar condition to a newly re-surfaced pitch which can then be renovated using whatever method is preferred. The vital point is that a new Rye Grass sward can then be established with a much-reduced amount of Poa Annua and no thatch. True fraise mowing can only be undertaken on a pitch that has, either been resurfaced in the previous year or has been fraise topped.

Fraise mowing when achievable will leave the surface devoid of thatch and Poa Annua also any small surface irregularities will be largely removed during the process. One area that appears to cause concern amongst some turf managers is the amount of material that is physically removed during the operation. Whilst, to my knowledge, no data exists, experience suggests that the total amount is far less than it first appears. The main

part of the bulk removed is in fact unwanted material comprising of leaf tissue and organic accumulations. Some soil is inevitably lost during the process, which is in real terms negligible and can be replaced by top dressing if required. Within this debris a percentage of Poa Annua seeds will be removed for disposal and they will not have the opportunity to re-establish on the playing surface.

When fraise mowing is complete there will be a visible light coloured tinge throughout the surface. This is the top of the Perennial Rye Grass plants which will, within a couple of days, start to turn green as the plant produces new fresh leaves from the root stock still in place within the soil.

Prior to the introduction of the FTM Groundsmen who wished to reduce thatch and Poa Annua were limited to the use of scarifyers during end of season renovation. As a contractor I have been involved previously in scarification operations which lasted for several days as we tried to strip a soccer pitch to make it as clean as possible, prior to other normal end of season operations commencing. During which time several sets of belts and numerous tines ended up on the scrap heap. Given that, apart from resurfacing, this was the only technology available at the time as a control against thatch and Poa Annua, I still had my doubts as to whether we were in fact reducing the thatch but at the same time encouraging the re-establishment of Poa Annua. Correct use of the FTM defiantly cleans out a far higher percentage of Poa Annua and removes all thatch and organic debris. However, noticeably in the stadium environment, some Poa Annua does manage to gain a foothold, which is not unexpected given the nature of the plant and its determination to survive.

Keeping Poa Annua at bay

Particularly in the stadium environment one theory suggests that soil bound Poa Annua seeds are present in sufficiently large numbers to re establish after "KORO®ing". This is to say that a seed bank is present within the soil which when exposed will regenerate and Poa Annua will start to colonise. When I first visited Rotterdam to see the results of work undertaken by the machines inventor Ko Rodenburg I was amazed at how little Poa Annua existed within the swards of the pitches which had been subjected to KORO® FIELDTOPMAKER® operations. After working with the machine in this country on heavily infested Poa Annua pitches it became apparent that one of the reasons for the purity of sward in Holland was that the operations had been carried out over a period of several seasons. This I believe has reduced the seed bank of Poa Annua by diminishing returns, to levels that do not cause further large-scale infestations.

Having spoken to several people who have used the FIELDTOPMAKER® to good effect, swards have returned to Perennial Rye Grass and the pitches they are responsible for have outperformed the slow spongy Poa Annua pitches previously seen. However some are of the opinion that now they have established a superior pitch they do not need to employ the FTM at the end of this season and wish to return to the more conventional methods. Choosing to scarify as we did in the past is, in my opinion, not an option. The resultant clean open rvegrass swards seen in Holland and now at some venues in the UK are a consequence of the routine use of the FIELDTOPMAKER® over a number of years. If we are to achieve the same results the FTM must be used routinely on an annual basis.

Adapting to change

One of the major benefits in using the FTM is that we can now produce pitches which are not prone to divotting out. Replacing divots takes up valuable man-hours that could be better spent on more productive aspects of sports turf management. Scarring does occur which is to be expected on a natural turf surface, scarring however has little effect on the balls ability to travel without deviation and can be repaired with far less effort.

What has been noticeable since the introduction of the FTM is that the amount of fertiliser required to sustain a sward is higher than that previously required, as is the case with first year resurfaced pitches due to the eradication of thatch. Previously pitches with thatchy organic accumulations would by nature hold on to a degree of nutrient within the top 20mm. This in turn leads to a proliferation of Poa Annua which, flourishes under such circumstances by thriving on the nutrients retained within the thatch layer.

Restricting fungal disease

Some groundsmen have recorded higher amounts of fungal leaf spot within their new swards. Rye Grass swards can be vulnerable to leaf spot attacks particularly when immature. This disease can be encouraged when the plants nutrient levels become diminished therefore regular applications of Nitrogen and Potassium are essential to maintain nutrient levels. Fortunately Fusarium appears not to be a problem in the new clean Rye Grass swards. This disease found an ideal home in soft thatchy Poa Annua swards where conditions were ideal for it to flourish and reproduce causing irreparable damage. The solution to keeping Fusarium at bay is expensive, repeated applications of fungicide could ultimately lead to depletion in beneficial fungi as well as those responsible for Fusarium.

Surface Hygiene

Surface hygiene in the form of scarification, verti cutting and sweeper collection all have a place in the production of a high quality-playing surface. These operations should be employed once a sward has been established after being cleaned out by the FTM rather than as was previously the case at the renovation stage. It is essential to undertake such operations to keep the sward upright and open. If a proportion of Poa Annua still exists within the sward, sound surface hygiene practices will prevent it from attaining its natural procumbent habit, which if left unattended will eventually lead to the production of thatch. Another advantage in keeping the sward upright is that Poa Annua plants will be lifted. When flowering the florescence will be removed by mowing before they turn to seed thus preventing the plants reproducing.

To summarise, we are now starting to appreciate what is involved in keeping Poa Annua at bay within the stadium environment, using cultural practices. End of season renovation should not be carried out without firstly either resurfacing, fraise topping or, in the case of pitches which have already been subject to one or the other during the previous year, fraise mowing. This can then be followed up by whatever is required to renovate the pitch. Attention given to surface hygiene during the growing months will assist in keeping the sward open and healthy. The aim of any winter games groundsman is to produce a pitch that will be in the best possible condition during the key months of winter, we now have more of a chance than ever to achieve this.

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Pitches – Why clubs should prepare rather than repair

ARTICLE 4 - DATED 2010

By Carl Pass - Director of Premier Pitches Limited

Professional football pitch management is no longer about providing a surface which will withstand the rigours of 90 minutes of football, any league groundsman will testify to this.

Groundsmen now have the additional pressure of providing a surface that will be used for a pre-match warm-up which can last up to 30 minutes. There are also half time activities including penalty shootouts, marching bands, dancers and junior matches played across the pitch. In addition, many teams now insist on a warm-down after the match which, in some cases, becomes a full-blown training session for squad players not involved in the 90 minutes of action which has just unfolded.

Success in European competitions brings additional burdens as travelling teams have access to the match pitch for training sessions on the day prior to the tie being played. Other events such as music concerts bring in much needed revenue to clubs who are in the business of making money by what ever means to support their main objective, which is to be successful on the pitch.

All these activities are undertaken often in grounds which have either evolved into multi-use venues or, worse still, have been designed with little or no thought to the well being of the pitch. The consequence of such relentless use is a degenerated surface which may suffer from compaction, poor drainage, little or no grass cover and uneven levels.

So where does this leave the person entrusted with producing a surface which will cater for all the needs of a professional football club? Clubs will not reduce the height of stands to reduce the impact of shade, nor will they open up corners of the stadium to allow increased air movement or reduce the amount of additional activity on the pitch during match days and in the close season. It is my view that we must take a positive stance to the situation by adopting a new philosophy of preparing new pitches rather than repairing old ones.

Come the end of the season, clubs who wish to maintain a high standard of playing surface whilst maximising revenue from other opportunities must accept that the pitch has done its job and replace it. Particularly in a stadium environment where the groundsman is essentially growing grass indoors, beginning the season with a new pitch offers the greatest opportunity for the surface to withstand the difficult environment it is expected to perform within. Stadium pitches in general have improved tremendously over the past ten years, which is a credit to all involved including groundsmen, researchers and manufacturers of specialist turf maintenance equipment. I'm fortunate to work alongside progressive agronomists and the new generation of sports turf managers/ groundsmen, who realise the advantages of preparing a new pitch, rather than repairing an old one.

So what are the advantages of pitch preparation rather than repair? When should it start and how is it achieved?

The advantage is that the existing pitch is available to the club to safely utilise for income generation prior to the new pitch preparation. Corporate and community events, sports days, pay-to-play football tournaments, fivea-side leagues and music concerts can all be undertaken in the knowledge that they will not affect the quality of the playing surface as it will be removed and replaced. An additional benefit, in some cases, is that part of the income generated from such events may be used to part-finance the pitch improvements.

Pitch preparation can start as soon as the corporate events are completed but preferably before the beginning of June.

How does the preparation system work in practice?

A consultant or the groundsman should either prepare a specification or discuss with a reputable contractor the work that is required and when it can commence. The specification will include a bill of quantities which will outline to the contractor what he is expected to supply and what the club may wish to supply themselves. As a contractor, I feel it's important that the groundsmen choose materials that they want to work with, as when we've finished and left the site, it is they who are responsible for seeing the pitch through to the end of the season.

- 2 Materials should be ordered and provision made to store them safely away from the elements as required. Bulk materials such as Fibresand or Fibrelastic need to be ordered in advance and a delivery time and date agreed.
 - As soon as the club's corporate department has finished with the pitch and all coverings are removed, the contractor should be on site ready to commence work.
- The existing pitch surface should be stripped using a KORO[®] TopMaker, a superb piece of equipment that has revolutionised the way pitches are renovated. The KORO[®] strips the entire surface, removing all organic accumulations leaving a clean, debris-free rootzone which can then be worked with to produce the desired playing surface.

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Initial cultivation can then commence to break up any pans or layering which may be present within the top 100mm of the pitch profile. This work also serves as the ultimate form of aeration as it redistributes particles around the profile and allows any anaerobic conditions to become oxygenated. Should any soil conditioners, such as seaweed or granulated lime stone and fertilisers be required, they should be applied at this stage to ensure they are thoroughly incorporated in to the vital top100mm of rootzone.

The first stage of pitch preparation is then complete. It is then up to the groundsman to use his skill and the relevant technology available to him to produce and maintain the new sward.

He can carry out this work in the knowledge that he has a completely refreshed rootzone, free from any layering and its associated problems. Drainage rates will be increased considerably preventing waterlogging during the wetter winter months. The sward will be made up of new grass plants all establishing seminal roots which will form the basis of a strong root mass, essential for durability. The weedgrass Poa annua will be largely eradicated to the point when it is no longer a problem and the whole pitch will be in better condition than it would have been if it was a pitch renovated from the previous season.

- Once initial cultivations are complete and dependent upon the specification, it would be normal practice to apply new rootzone material, which is often Fibresand or Fibrelastic. This is intended to replenish any material lost during the removal of the surface with the KORO[®] TopMaker. It's important to use a specially adapted drop spreader, such as the Raycam Speedresser, which is capable of handling this type of material without bridging or blocking as work progresses.
- The evenly spread material can then be integrated in to the top 100mm by further cultivation, normally with a rotary harrow. At this stage visual inspection will dictate how many passes with the cultivator is required to produce an evenly blended rootzone. The final pass will be made and levels trimmed to be consistent with those of the original construction.
- Consolidation will be required next. This is a vital aspect of the works and should be carried out evenly and accurately all over the pitch to achieve consistent results. As work progresses it may be necessary to irrigate at this stage to maintain a degree of moisture in the immediate surface, preventing the separation of fibres. Fines in the rootzone can also find there way onto the surface as a dusty residue if irrigation is not available, causing problems later in the season by impeding surface drainage.
- 9 Fine finishing is a vital aspect of achieving the end result. This work should be undertaken by skilled operators using specialist machinery and equipment. When surface levels are seen to be satisfactory the next stage of the works can commence.
- 10 The pitch should be over-seeded with a seeder designed specifically for sowing a pitch from scratch. Usually two passes will be made with this type of machine, but more may be required if the groundsman or consultant dictate otherwise. Finally, the pitch should be flat rolled to seal in the seed and produce the finished level.

The work I've described is more expensive than standard renovation but not so high that it should not be within the budget of any professional football club. Those with very limited budgets could achieve an acceptable result by fraize mowing to clean out the vegetation and overseeding, enabling them to begin each season with a new sward.

To get the very best from the playing surface, new pitch preparation should be carried out each year. In reality, budgetary constraints and other issues, such as restricted timescale, may prevent it. From my experience of working across the UK and in Europe, it should be a major consideration for any club who want to maximise both pitch performance and profitability.

KORO® makes it easy

It is not every day you discover a piece of machinery that shouts "buy me; I can be a great help to you".

This is exactly what happened when, along with members of the groundstaff, I visited Stamford Bridge to see the KORO® FIELDTOPMAKER® in action. The machine being used was far too large for a tennis court, but the principles behind it were interesting and the results were impressive when used to strip the pitch ready for mid season returfing. It was impressive in both the speed it worked and the finished level it produced. From this first viewing, it was clear that a smaller machine would be ideal for many areas, including tennis courts.

When the smaller machine became available it was trailed away from the Wimbledon courts but as a result of the trial it was decided to purchase one for use at Wimbledon. The question to be asked is why use the machine when we are not looking to returf. The answer is that similar to the majority of grass playing surfaces, we can at some time suffer from an invasion of poa-annua. In the past, attempts have been made to control such invasions with limited success. By using the Fieldtopmaker it has been possible to remove much of the sward from the court very guickly and efficiently, so eliminating a great percentage of poa in one go within the Renovation Programme. Once the sward has been removed, then a programme of reseeding with ryegrass and top dressing will produce the desired surface for the following season.

The theory of the operation is with the growing point of the ryegrass being approximately 1cm below the poa or at least the great majority of it, and leaves the ryegrass to regenerate.

Having obtained the machine through Richard Campey there was a need to ensure that the groundstaff who operate it were trained to use it effectively. Richard Campey had two senior members of staff work with the groundstaff the first time it was used. To achieve the desired results and leave much of the ryegrass, the machine, which is easy to adjust, had to be set to the correct depth. The ideal conditions for the machine is a dry surface, however the courts being constructed with a clay soil do become very hard when dry. The Fieldtopmaker had coped with this without any difficulty.

The machine was first used in August 2001 on one of five courts stripped of foliage. The blades which, in simple terms appear to be similar to that of a cultivator, removed a vast amount of material. Fortunately, there is an integral conveyor belt which delivers the waste into a trailer so that it can be transferred to a skip as required without any manual handling. Providing care is taken to ensure that the machine is set level then the final surface is also level.

With the foliage removed, the remainder of the Renovation followed. The programme was to aerate, over sow, top dress and then cover with a germination sheet. The current seed mixture is 100% ryegrass. In a week the court was green again and within 10 days the first cut was taking place. The face that so much of the sward was removed did result in the use of more seed than normal, along with an increased volume of top dressing. In both cases this was in the region of 100%. With sufficient numbers of staff, it is possible to carry out the whole procedure from start to finish in two days. Two people can deal with the operation but of course it would take longer.

The Fieldtopmaker will not remove 100% of the poa, but it will dramatically

reduce it. An independent analysis of the court has shown that the poa has been reduced to approximately 2% throughout the court. To achieve this in one Renovation Programme is something what can only be dreamt of without the Fieldtopmaker. One other advantage of the Fieldtopmaker is the effective removal of thatch. By setting the machine to the correct depth it is possible to remove a layer of thatch in one operation. This would then have to be followed by a similar programme of seeding etc.

While the Fieldtopmaker does assist with the removal of poa and thatch, I would advise those considering such work to make allowances for the growing season in their particular part of the country, even if this would mean closing the facility early one year to ensure that it is ready for the following season.

Those who have personally seen the results of the work have expressed very positive views on the quality of the turf. The turf does have an even appearance without those unsightly light coloured poa patches. As with all new procedures, there is a leaning curve. I have learnt that it is necessary to have a dry surface in order to get the full benefit of the machine. Now we have to learn how frequently we should use it on any individual court.

We would like to thank Eddie Seaward for his fascinating article and look forward to hearing from him again in the future.

Courtesy of Mr. Eddie Seaward, Head Groundsman at The All England Lawn Tennis and Croquet Club in Wimbledon and covers the renovation of the grass tennis courts at Wimbledon using the KORO® FIELDTOPMAKER.



KORO® FIELD TOPMAKER

Warning: Seeing the KORO[®] Field Topmaker for the first time can make some turf managers break down and weep with joy.

The reason for this unbridled passion is the realisation that the Field Topmaker can save days of backbreaking work while rapidly producing clear, healthy swards of turf over large areas.

The Topmaker can de-thatch, level, weed, remove Poa annua and similar shallow-rooted grasses and discard waste material – all in one tractor pass.

KORO[®] machinery, made in the Netherlands and distributed in Australia by NWS company Manoeuvre Mow, has won many instant fans within the international turf industry as demand for high quality, pure species turf has grown. The Topmaker has been used successfully in the renovation of sports fields, cricket grounds, lawn tennis courts, golf fairways, and tees, as well as football ovals. Well known Australian venues have benefited from the Field Topmaker "make-over" include: Stadium Australia. Melbourne Cricket Ground. Colonial Stadium. The Gabba. Bruce Stadium in the ACT and six grounds used at the Sydney Olympics. There are 2 models: the FTM 120 (1.20m) using 30-40hp tractor or the FTM200 (2.00M) 60-65hp tractor. Both models require tractors to have creep gears or hydrostatic transmission. Here's how the machines work: When attached behind a tractor, the Topmaker removes the entire turf surface to a depth of up to 50mm. The depth setting is fully adjustable depending on the severity of thatch removal and surface levelling required. The machine can cover up to 10,000 square metres in a single day in dry conditions depending on depth of cut and machine model used.

While the "removal" of surface turf, including a small amount of topsoil may sound like a dramatic and perilous activity, the experiences of users here and overseas have quickly allayed users' concerns.

When a surface is "KORO®ed", all thatch is totally removed, and unwanted surface material is simultaneously hauled up a conveyor belt into a chute, trailer or similar mobile collection unit. The shaved surface is still above the level of precious root systems of preferred grasses like couch and kikuyu, and is otherwise free of most other impurities.

The KORO[®] Field Topmaker de-thatches, levels and discards waste in a single pass.

This cleansed base is then in a pristine state for

rhizome regrowth to take place or, with ryegrass, overseeding and fertilising, supported and enhanced by regrowth from the dominant roots below.

No Chemicals

In the case of Topmaker users like the All England Lawn Tennis & Croquet Club at Wimbledon, the eradication of problem species, notably Poa annua, has been 98% successful. Given the ubiquitous presence of some seeds, it is impossible to guarantee 100% removal of a given pest grass (apologies to Poa fans)...but 98% isn't bad. The result is exceptional, but even problematic and neglected surfaces, once passed over by the Topmaker, should enjoy a 90% reduction in unwanted shallow grasses.

There have been huge successes in Western Australia eradicating "Parramatta grass", with that process now replacing the use of the banned "Atrazine" chemical treatments. There are heightened levels of concern within the industry and general media about the overuse of chemicals to maintain turfed areas. Regulations are becoming more stringent, as evidence by recent legislation affecting pesticide use in NSW, and the need for more mechanical methodologies to cure perennial problems is more urgent than ever before. Machines like the Topmaker provide effective alternatives to spraying programs while also tending to thatch build-up and levelling in one season.

On The Level

Finally, an obvious advantage of the process is a levelling of the surface. Golf fairways, rugby pitches and racecourses, for instance, can feature unwelcome small furrows, impact mounds and associated damage areas and the Topmaker has the capacity to remove such blemishes to create a seamless and smooth turf plane. Fast recovery periods – involving mowing just a week or 10- days after pass – make annual treatments manageable and indeed sensible.

Geoff Hatton – award winner and 40-year industry expert – at Manoeuvre Mow, 246 McKee Road, Theresa Park, NSW, on (02) 4651 2229 or e-mail: info@ manmow.com.au.





KORO® REVOLUTION

It is often argued that golf was invented in Holland and not as perceived in Scotland. This would explain why the Dutch seem to have such a good grasp on turf maintenance and improvement. First we saw the vertidrain and for those of us who have used a hand fork to aerate, it is fair to say this machine was a miracle. The next improvement to Stadiums was seen to be the Desso Grassmaster System, which love it or hate it is radical to say the least. Since the verti-drain soil aeration products have stood still until now. Last year I had the opportunity to trial the new KORO[®] Recycler System

When we tried it on heavy wear areas in conjunction on my own course and several others, all of which had with seeding the results have been fantastic. Most differing problems and although the machine was in the of the mentioned problems can be found on most process of being modified, the results were good in all courses, new and old. I believe the Dutch have come instances. This is not just a machine for Groundsman up with the next verti-drain. I remember it took about but also for Greenkeepers too. 8 years for the verti-drain to take off, as people were First and foremost is the problem of layering in greens, sceptical, including myself. My last and most influential which at sometime most of us have to deal with. We Head Greenkeeper once said, "Don't knock until you've normally try to combat these problems with hollow tried it" in many different instances. In this instance coring and top dressing. The KORO® Recycler will I would say the same thing because the benefits are speed up this process of soil integration. The tons of immense. There is however one downside to this topdressing which have been applied will be evenly machine on older greens, and that is stones. They mixed and applied again. are at present developing a collection system to solve this problem but I believe the benefits outweigh the On old "Push up" greens this is a very big plus and costs as the machine stands now. On USGA greens, although disruptive is no worse than verti-draining or seeing is believing, it is simply outstanding. As most hollow coring. The effects on dry patch and fairy rings of us at some time have some of the aforementioned is excellent. We tried the machine on a USGA green problems, I can see this machine becoming part of our and you could and can still clearly see the benefits of yearly work programs and for those with more acute oxygenation to these said areas. When tested we did problems, black layer, layering and compaction, give half the green and the nutrient uptake and freeing up of it a try, you have nothing to lose and you could save micro nutrients was plain for all to see. yourselves a great deal of time and money.

Treatment of Black Layer, for which I believe this machine needs to be harnessed, is just one of this machines uses. We all know oxygenation of the Black Layer is important to solving the problem. What could be better than bringing the contaminated soil to the surface

to oxygenate? It could be argued that this would merely spread the problem but in practice this appears not to be the case, in fact it is guite the opposite. With the more limited use of fertilizers and fungicides around the corner for us all, it is important to try new techniques. In the right application this machine will assist us in reducing N, P, K, applications by simply releasing locked up nutrition in much the same way as verti-draining and hollow coring. There could also be a saving on top dressing materials especially on Greens and Tees.

Chris Haspell, Course Manager Denmark

Managing the soil using KORO® 1.2m FTM

The accepted truism that greenkeepers don't manage "the grass" they manage "the soil", is as relevant today as it ever was. If the growing medium is favourable for roots to exploit nutrients, water and oxygen, then it stands to reason the grass is likely to be in a healthy condition and therefore able to be presented in the best possible condition to accept play. In essence, the grass will be able to withstand the rigours of the many stresses the greenkeeper places on the grass plant in order to achieve a fast, firm and true putting surface.

One of the necessary bi-products of actively growing turf that has a negative effect on the physical properties of soil is thatch. A little thatch is actually beneficial and many articles on the subject offer that somewhere between 5 - 10mm is considered optimum. Whether you agree with these tolerances or not, the general consensus of opinion amongst most Head Greenkeepers is that they would like to reduce the depth of thatch on their greens.

The rate of thatch accumulation on greens differs between courses dependent on many variables such as nutrient input/output ratios, precipitation, cultural management, height of cut and grass species etc. A good rule of thumb is to expect an annual accumulation of approx. 20% year-on-year, especially relevant if using high shoot density cultivars of creeping bent, if minimal cultural management is in place. This figure would not continue unabated however as equilibrium depth of thatch would be attained at some point allied to management practices. In golf green management however, this balance would result in thatch that was way too deep to be considered acceptable and therefore some form of continued intermittent thatch management is essential for the preservation of soil conditions able to provide healthy grass growth.

In an ideal world, greenkeepers would all have the perfect cultural management practices in place whilst they have between 5 – 10mm of thatch (or whatever your individual preference is) and therefore would not need to employ overly deep scarification to retain their desired thatch depth. However, as we are all too aware, it is one thing to prescribe what should be the optimum thatch depth and quite another to maintain it; and so most greens have more than the optimum level of thatch in their greens. We can therefore rationalize that in order to get to a point where greenkeepers can perform thatch management, they first have to attain thatch removal.

Most of the mechanical apparatus available to regularly reduce thatch accumulation is suited to the preservation of the optimum level of thatch and not for its reduction. The current verti-cutting/ scarifying reels on offer are generally acceptable for thatch management at shallow depths but once the depth has even marginally increased these apparatus become more of a grass management tool rather than a thatch reduction device.

Apparatus like the popular thatch away verti-cutting units are an "easy sell" to the greenkeeper because of three criteria that they fulfil: Firstly, good collection properties (surface hygiene). Secondly, the relative distance between the cutting blades in relation to the size of a golf ball, which evenly spreads any roll path deviation. Thirdly, the reduction of lateral growth in the turf, which results in a good tight-knit sward. These are all valuable criteria to consider in management of golf greens and these type of apparatus are extremely useful but they donot achieve good thatch removal at depth.

The current type of reciprocal thatch reduction/removal machines on offer commonly fail to achieve the criteria met by apparatus such as the thatchaways, i.e., poor surface hygiene, the distance between the blades is too great in relation to the size of a golf ball and, because the distance between the blades is so large, lateral growth is not effectively reduced.

The ultimate deep scarification device would combine the criteria attained by the thatchaways and at the same time cut to such a depth so as to achieve the maximum level of thatch removal possible. The only machine capable of achieving all four criteria is the KORO® FIELDTOPMAKER[®]. The unique design accomplishes unparalleled surface hygiene, 20, 40 or 60mm spacing between tines and up to 50mm depth of thatch removal! Combine this with excellent contour hugging properties and you have the superlative thatch removal tool. The machine runs behind a compact tractor and requires around 35 to 40 horsepower. A double acting hydraulic valve is needed to drive the belts that convey the material into a small trailer of Utility truck. The machine can also be equipped with a turf-stripping rotor to remove the total surface of i.e. Greens, Tees or anywhere turf needs to be stripped off.

Go on... don't kid yourself, RID yourself...





'Best ever' renovation results achieved at manchester united's trafford training centre

Joe Pemberton, Head Groundsman at Manchester United's Trafford Training Centre says he's observed noticeably improved results from their end of season renovation work after using innovative, high workrate machinery supplied by Campey Turf Care Systems.

Work began on the first team pitches at the Carrington complex on 10th May and from that point, Joe and his six staff had an eight week window to get them ready for the squad reporting back for training during the first week in July. The initial task of stripping off the existing vegetation was expedited after Joe opted to upgrade the 2m KORO[®] by Imants TopMaker he'd used for the past six years to a 2.5m machine with improved specification, offering time and efficiency savings. More blades and a wider belt enable it to have a greater forward speed, producing a faster, cleaner finish.

The pitches were heavily scarified with a 1.9m Omary TER flail mower and collector beforehand to remove as much weedgrass and debris as possible before Joe and his staff completed two passes on each pitch with the KORO[®] removing the top 10mm. Sheffield-based contractor Premier Pitches was then drafted in to apply 40 tonnes of sand with a Dakota 414 topdresser before running the KORO[®] by Imants Recycling Dresser 1900 across the area, relieving layering and compaction, aerating vertically and horizontally and bringing an additional 40 tonnes of rootzone to the surface, where it was ameliorated with the sand and respread as a dressing. To complete the renovation, they sowed a high quality ryegrass seed mixture, carrying out six passes with the Vredo disc seeder then additional passes with a Raycam Aeraseeder.

"Once the grass was fully established six weeks after sowing, we went over the pitches with the verticore using solid tines to relieve surface compaction and oxygenate the top layer. The results have been outstanding" Joe confirmed. "The pitches are level, decompacted and aerated throughout the profile and the new sward established well. Five weeks after the work began, the pitches are playable. It's definitely the best results we've had from our renovations." "In previous years, we've only used vertical aeration as part of the renovation programme. This was the first time I've ever used the Recycling Dresser. It suited our construction and I was incredibly impressed. To be able to aerate the full profile and ameliorate the rootzone with the sand in one pass without disturbing surface levels is extremely beneficial."



"It's becoming increasingly important for us to own rather than hire specialist machinery as we need to have the flexibility to work on our pitches when training schedules and weather conditions allow. The renovation programme was carried out in stages and one pitch had to be kept available throughout the renovation period in case any of the coaching staff or players wanted to use it, so we needed to complete each stage quickly and efficiently. We began work on the academy and reserve team pitches on the 12th April, then the first team pitches were completed once the Premiership season had concluded. The vouth section was last to be renovated at the end of May." "In the past year we've acquired three New Holland tractors and the KORO® which enabled us to carry out a proportion of the renovations ourselves. Having seen the results, we'll be looking to invest in several other pieces of specialist machinery over the coming months. Being a local company, Campeys provide us with on-demand technical assistance and rapid access to parts and service with all our machinery, which is invaluable."

Desso developments / KORO® UNIVERSE ROTOR

DATED 2012

By Carl Pass - Director of Premier Pitches Limited

Few can argue against the fact that the Desso Grassmaster System has been a fantastic development in professional natural turf sports surface technology, especially in high use scenarios such as multiuse stadia. One of the few worries that some Groundsmen have with the system is the ability to effectively renovate the surface and the knockon effect that this has on the health of both the natural grass and the soil structure. When the installation of Desso was first mentioned as a solution to the woes of the 'New' Wembley pitch, most the online chat rooms were flooded by comments concerning the suitability and the ability to renovate it or re-turf it. Pitchcare's very own Dave Saltman mentioned at the time, 'In my opinion, such a stadium needs a surface that is flexible, one that can be easily renovated and re-turfed whenever necessary. A desso pitch does not give that flexibility.'

This expression of opinions was not too surprising considering that some of the early Desso pitches were eventually replaced because the years of partially unsuccessful renovations had taken their toll on the soil structure and the ability of the of the natural grass to survive full season. This wasn't a failing of the Desso system or the work that was undertaken by the renovation contractors, it was just that the technology hadn't yet been developed to successfully renovate these high spec pitches to the same standard as natural and fibre reinforced pitches. Thankfully since these early days there have been further developments in the way that Desso pitches are renovated, but there are still questions as to the standards of success, the cleanliness of the operation and the time it takes.

As we all know the longer it takes to complete and project, especially in the English summer time, the greater the likelihood that it could be affected by the weather. If this were to happen partway through some of the current methods of Desso renovation then you would have a pitch that is covered with a soggy mulch that is near-impossible to clean off.

After closely monitoring the performance of Desso Grassmaster pitches, Carl Pass, Managing Director of Premier Pitches Ltd, realised that one of the main factors contributing to the success and longevity of this type of pitch is the ability to totally remove the organic accumulations on the immediate pitch surface, thus exposing the Desso Fibres, in a much more efficient way so that the seed can be sown in the ground as quickly as possible.

It was with these issues in mind that Premier Pitches, Campey Turf Care Systems and Imants set about the 4 year development of a new and unique Desso Grassmaster renovation system. The main benefits of this system include much greater efficiency meaning a much quicker process with extra emphasis on surface hygiene, in comparison to current methods, which is so important with these types of pitches.

The development of both the process and the equipment has been meticulous and the results have been fantastic. After trials of the prototype last year at the Doncaster Rover's Keepmoat Stadium further tweeks and improvements were made. This year Premier Pitches have successfully renovated The Keepmoat Stadium, and ran live Demo Days whilst renovating Norwich City's Carrow Road and Bolton Wanderers Reebok Stadium which were very well received by the clubs and the attendees.

All three projects have been a great success and achieved an unsurpassed level of surface cleanliness in minimal time, and without any fuss. The removal of the existing herbage, exposure of the Grassmaster fibres, aeration, top dressing and seeding were all completed within 3 days despite the wet weather conditions which didn't slow down the projects at all.

The process is far more efficient than alternative Grassmaster renovation processes in the current market place. All the material that is removed from the pitch is moved from the conveyor belt into a trailer and then dumped off site, giving an extremely clean process. Above all, it achieved the clean organic free surface which is key to the successful performance and longevity of any Desso Grassmaster Pitch.

Don't let the grass grow under your feet

By Carl Pass - Director of Premier Pitches Limited

It's now over a decade ago that I was privileged to be introduced to the KORO[®] range of machinery and the people involved with its development and marketing. At the time I viewed its application as revolutionary, and it certainly was. Thanks to those involved we rarely see soggy Poa annua dominated pitches and slow low cricket squares or loopy bouncing tennis courts as we did prior to the introduction of the KORO[®] FIELDTOPMAKER[®], when we do I can personally guarantee that the FTM has not been used during the previous close season. KORO® FIELDTOPMAKER®s are now widely available and the majority of sports turf contractors will have at least one or more in there armory of equipment. Following discussions with several leading Groundsmen and through my own observations it became clear that not all contractors and Groundsmen understood the various processes that the KORO[®] FTM was capable of and how they could best be achieved. Some younger Groundsmen would not be aware of why the machinery was developed and have little knowledge of the desperate situation which existed prior to the introduction of the FTM.

There are three main functions of the machine.

The first is to completely remove an existing sward prior to cultivation; a good example of this would be when a Fibresand or Fibrelastic pitch is to be renovated by cultivation. I would describe this as "Top Off" and it would be done making two passes in normal circumstances but in exceptional circumstances more may be necessary. The resultant surface would be thoroughly clean and devoid of all organic residues leaving it ready for cultivation etc.

Its second function is what we at Premier Pitches describe as "fraise topping" this is rarely required these days but never the less I will describe the process. Fraise Topping is more or less the same as "Top Off" but a degree of organic may be left on the immediate surface, however all herbage will be removed and generally there will be little or no green remaining. Fraise topping serves to remove the bulk of a Poa annua sward but leaves the surface clean and ready for a completely new sward to be established, by seed, once work is completed. Again two passes will be required, one to remove the bulk of the existing sward and the other to clean up. Attention to detail and keeping the surface clear of debris is absolutely vital if Poa annua is to be eradicated. Poor workmanship at this stage could lead to Poa annua seeds being redistributed only to remerge in a linear fashion during sward establishment which obviously defeats the object of the exercise.

The third and the least understood mode is "Fraise Mowing" which is suitable for football, rugby and cricket pitches plus tennis courts that have a low percentage of Poa annua and a higher percentage of Perennial rye grass or smooth stalked meadow grass sward. Despite what some within the industry think and say you cannot fraise mow a Poa annua sward it would need "Fraise Topping" or Top Off and then cultivating as described above. Fraise mowing is designed to grub out shallow rooted grass cultivars such as Poa annua and leave the growing eyes of desirable grasses intact allowing them to regenerate and create a new sward which is devoid of superfluous surface organic layering associated with the poor performance of any pitch, cricket square or tennis court. Fraise Mowing a well maintained pitch or court would ideally be done with a well-furnished set of tines capable of cleanly cutting through the

sward whilst creating enough draft to pick up debris and deposit it on the belts for elevation into catching trailers. For the correct results to be attained an in depth knowledge is required as to the correct forward speed and depth settings relevant to the PTO speed of the tractor. Once again a minimum two passes will be needed; the sward should be stood up by grass harrows between operations. A successful undertaking would resemble a high class cricket wicket ready for play i.e. devoid of all organic build up, a light shade with a slight green haze. On inspection you would expect to see the arowing eye of the desirable grasses present between patches of rootzone. When complete the pitch would normally be top dressed, aerated then seeded using both disc and dimple seeders prior to being fertilized. In layman's terms Fraise mowing can best be described as ultimate scarification.

There is no doubt as to the value and success these processes have brought to the sports turf management industry over the past decade. However we can never be complacent and excuse the pun "let the grass grow under our feet". When working with leading groundsmen and agronomists they are constantly looking to revaluate and improve, sometimes it's only by a small percentage as some things cannot be altered or reinvented but only tweaked, on other occasions things need to be altered significantly to produce improved results.

Campey Turf Care, KORO[®] and Imants are well known machinery pioneers with a highly respected pedigree and track record when it comes to new innovations; as such we have often discussed with them how we can look at certain aspects of equipment to improve performance and efficiency. As ever they took ours and other people's comments on board and developed a new generation of FIELDTOPMAKER® rotors called the TerraPlane. Whilst at first glance the machine appears almost identical to the old FTM machine several vital key elements have been totally redesigned including the rotor, to improve the machines operational capabilities.

The new generation KORO[®] by Imants TerraPlane elevates Fraise mowing to a new level, efficiency, accuracy and overall performance have increased to deliver the client with a far superior product at the end of the procedure. "We at Premier Pitches have worked with the machine for the past two seasons now and the results have been outstanding. Surface levels are improved with no tine corrugation present; hygiene is paramount when fraise mowing and the new TerraPlane offers an unrivalled provision of surface cleanliness as it removes the remaining sward. The entire end results are superior to any previous work undertaken by the most competent operator with the best machinery available. As a consequence I believe that the more progressive groundsmen and agronomists will be demanding that their pitches are TerraPlaned rather than fraise mown in the future".

The development of the TerraPlane is a fine example of why we must not become complacent and reliant on existing technology, if we do and for those who can remember the dim and distant past we would still be talking constantly about eradicating the dreaded Poa annua and how to make water drain through thatch.



Fraze Mowing Bermudagrass -Summary of A New Concept

Posted on January 30, 2013 at www.growinggreengrass.net

Fraze Mowing Bermudagrass-Summary of A New Concept

Fraze mowing is a process that has spread across the European field maintenance industry. Fraze mowing is simple- using a KORO® FIELDTOPMAKER, the top layer of the field is removed (1/4-1/2" down).

That removed top layer includes materials that can cause issues with a field.... detrimental build ups from a growing season are annually removed to create a better environment for plant strength and field playability.

Black layer/ surface slickness is eliminated

Thatch build up causing softness and giving a home for disease pathogens and pests is cleaned out

3 Weed seed (including poa annua) is removed.

Cultural practices such as core aeration, verti-cutting, sweeping, topdressing, etc clean out these "challenges" as well. The difference in these cultural practices v. fraze mowing is that the cultural practices slowly remediate the issues over time. Fraze mowing removes the issues immediately. Certainly the intentions with slow remediation are good... but likely the end goal never gets reached. With fraze mowing, the recovery time can be a bit longer... but the issues are completely fixed and the field is at full strength again

Fraze mowing with a KORO[®] FIELDTOPMAKER is a

process created for cool season turf grass, as European fields are primarily ryegrass. And fraze mowing, in conjunction with the entire KORO® Renovation Process, has been revolutionary for cool season surfaces... creating a more durable surface free of poa annua and weeds.

Fraze Mowing Bermudagrass Playing Fields in the USA

Fraze mowing warm season turf looks to have more potential to revolutionize warm season fields even more so than cool season.

Here's why:

- Clean out thatch completely No thatch allows Bermudagrass to grow laterally instead of vertically to get through the thatch, creating a more durable plant-No thatch reduces the potential for disease pathogens and pests to attack- No thatch creates a better environment for overseeding to grow, as seed easily can make soil contact to root completely and requires less water
- Clean out previous year's overseeding and weed seed bank

3 Promote stronger Bermudagrass plants that are attached to the soil and save energy as they grow laterally... not vertically through thatch.

At Maryland SoccerPlex, we tried froze

mowing Bermudagrass in early September for the 1st time. Here is how the process proceeded:



Fraze Mowing

Bermudagrass



Fraze Mowed Bermudagrass Day 1



Fraze Mowed Bermudagrass Day 4



Fraze Mowed Bermudagrass Day 8

The results were dramatic with recovery... And no fertilizer or extra water was added to promote grow-in. The existing rhizomes started putting on leaves and runners nearly immediately, even in early September when day length was shortening and night-time temperatures fell into the 40's by Day 7. The experiment was to see how guickly the Bermudagrass would re-establish w/out encouragement. Certainly it showed it is resilient!

Campey Turf Care and Imants (manufacturer of the KORO® Field Topmaker) then introduced us to the new "Universe" rota that had been designed for the Field Topmaker that has just come to market at the STMA Show in Daytona. "Universe" was initially designed for fraze mowing Desso fields (sand fields sewed with synthetic carpet fibers). The cork screw motion and smaller teeth do not





Fraze Mowing Burned Down Bermudagrass w/ the "Universe"

"Universe" Fraze Mowed Bermudagrass

Now the "Universe" has been introduced to the world via the winter trade shows in Europe and the United States. There are 4 "spirals" of teeth wrapped around the rota for a 100% removal of material. 2 "spirals" of teeth can be removed to reduce the impact of fraze mowing and leave more material if the user desires.



"Universe" Rotor

break off or pull out the synthetic fibers.

It instantly became obvious that the "Universe" would work very similar on the long. Bermudagrass plants as it does on the synthetic Desso fibers- The cork screw motion would "clean out" the thatch and foreign material in the top layer of a Bermudagrass field without removing the strong, established Bermudagrass plants completely - The established, strong plants then would have the ability to regenerate even more quickly than when fraze mowed with the standard Field Topmaker rota with much wider teeth

Upon demoing a prototype of the "Universe" in October on burned down Bermudagrass at a golf course in Phoenix, AZ, it became clear that the "Universe" is a next generation cultivation tool for "cleaning out" Bermudagrass:



"Universe" Fraze Mowed Bermudagrass



"Universe" Rotor



Fraze Mowing Bermudagrass - Summary of A New Concept - Continued

Certainly fraze mowing Bermudagrass, or any grass for that matter, is an extremely aggressive approach to turf grass maintenance. But the positives are overwhelming if a field is able to be taken out of rotation for a week or so:

- Reduces/ eliminates multiple verti-cuttings during the season
- 2 Reduces the amount of ryegrass seed needed for overseeding
- B Reduces the amount of water required to germinate the rye grass seed
- 4 Reduces/ eliminates the need for chemical rye grass and weed herbicides for cleaning out and transitioning back to 100% Bermudagrass
- 5 Creates a stronger stand of Bermudagrass as the strongest survive and sustain as the plants that begin to take over the stand
- 6 Reduces/ eliminates scalping and "tufting" of the Bermudagrass as it is growing laterally across the ground instead of growing vertically through thatch
- Allows energy savings and creates thicker, tougher Bermudagrass plants because extreme elongation isn't taking place to get through the thatch to the sun

Closing Thoughts/ Personal Observations:

Certainly there are challenges with fraze mowing with the "Universe" rota on a KORO® Field Topmaker. The amount of material generated is going to be vast, especially the 1st time. Additionally, the availability of machines is limited. But ultimately, the biggest challenge to fraze mowing and "cleaning out" Bermudagrass is that being so aggressive to a field will make any field manager nervous. It will create nervous administrators and users as well.

But no different from world-class facilities such as Wimbledon, Old Trafford (Manchester United), Emirates Stadium (Arsenal), Manchester United's Carrington Training Ground, Real Madrid's Santiago Bernabeu, and FC Copenhagen's Parken Stadium, United States fields can quickly adopt the aggressive approach and see a dramatic change in field quality just as those in Europe. "Cleaning out" Bermudagrass by fraze mowing is absolutely a concept from the future that will revolutionize Bermudagrass field quality and durability. xperience of working across the UK and in Europe, it should be a major consideration for any club who want to maximise both pitch performance and profitability.



New blade brings finesse to fine turf

PRESS RELEASE - 2ND SEPTEMBER, 2015

A new range of blades for the KORO[®] FIELDTOPMAKER[®] (FTM) from Campey Turf Care Systems is about to add another dimension to turf maintenance.

The success of "KORO[®]-ing" has been enhanced over the years with the introduction of new specialised rotors. First came the Universe® rotor, allowing Universe® Fraze Mowing to be carried out, followed by the Terraplane®. Now in 2015 another major change is about to take place. A new range of blades called Universe® Finesse to be used with the Universe rotor has been launched and will take fraise mowing to a new level. These can be fitted to the Universe® rotor in a variety of configurations to allow the groundsman/greenkeeper to use the KORO[®] FTM for different working practices from surface verti-cutting to deep linear aeration/scarification up to 25mm deep, whilst maintaining single pass surface hygiene A professional turf manager will be able to treat specific

Richard Campey explains the significance of the change. "We have some of the greatest pitch renovation techniques in the world in the UK. Many of our grounds professionals have already adopted these tried and proven methods. Now we are looking at the detail, the daily routine maintenance and essentially preventing small problem areas becoming major headaches."

He continues, "We have developed a new blade called the Universe® Finesse which will essentially let you "Universe® Finesse mow" as part of your regular maintenance programme for turf health and hygiene."

Results of research and testing on different sports turf and grasses, show turf recovery times vary depending on many

factors specific to the individual surface. This could be down to usage, maintenance programme, and type of grass or climatic conditions.

To address these variations the Universe® Finesse is available in several different thicknesses. 5mm and 3mm have been identified as the most effective options for producing a more refined finish on all types of surface conditions.

A professional turf manager will be able to treat specific areas of turf and remove organic matter under very controlled conditions using a combination of alternate rotor spirals, cutting heights and spacings from 15mm, 17mm, 35mm and 37mm.

In addition the working depth of the rotors can be set with infinite precision and all the blades can be used on natural turf, for both cool and warm season grasses, and hybrid surfaces.

For more information on the Universe® Finesse blades and the full range of equipment from Campey Turf Care Systems visit www.campeyturfcare.com



British patents granted for Campeys KORO® UNIVERSE® ROTOR

PRESS RELEASE - 27TH NOVEMBER, 2015

British Patents have been granted for Campey Turf Care Systems Universe[®] Rotor for its unique action with the KORO[®] FIELDTOPMAKER (FTM) as a maintenance and renovation tool on DESSO GrassMaster[®] and natural grass surfaces.

The Universe® Rotor for the KORO® FIELDTOPMAKER® was initially developed for the annual renovation of DESSO GrassMaster® playing surfaces, where it can clean out 100% of the organic matter build up on a pitch in four hours in one pass. The British patents are in recognition of the unique action of the Universe® Rotor which is unlike any other and worldwide patents are currently pending approval.

Patents have also been granted for the rotor design by Imants and for its unique work on warm season Bermuda grass surfaces covering sports pitches, golf greens and fairways. Studies of its use have shown excellent removal of surface debris resulting in a renewed clean playing surface within 21 days.

In UK and Europe where Poa Annua is present in the playing surfaces and beginning to take over, the Universe

® rotor has again been used to maximum effect when fitted with the Finesse[™] blades.

By setting the rotor to a precise depth, with the micro adjusters on the KORO[®] FTM, it is possible to grub out the poa plant, leaving all of the deep rooted good grasses. With a light top-dressing and overseed with a Vredo seeder these surfaces can be playable again within three weeks, and most importantly they will be poa free.

The Universe® rotor was recently displayed at Saltex and will be showcased at the forthcoming BTME exhibition in Harrogate, the American Golf Industry Show (GIS) and Sports Turf Management Association (STMA) in San Diego, and the Turf grass Producers International (TPI) in Texas 2016.







The new KORO® FIELD TOPMAKER models (FTM) launched in 2018



The unequivocal success of the FTM[®] across all sports surfaces, including golf, has helped produce healthier turf through greatly improved surface hygiene, but the enhancements to the machine take it further.

To make it more user friendly for golf the weight and balance has been analysed, resulting in a lighter, steadier machine. Solid locking pins now offer greater consistency, and the overall performance is improved due to the redesigned UNIVERSE[®] rotor and angled cross conveyor.

The new angled cross conveyor has been introduced to move material evenly with perfect belt tracking, whilst the weight of the machines has been reduced using a removable 100kg that greatly improves the overall weight balance. The redistribution of weight means a much smaller tractor can be used to run the KORO® FTM® because the centre of gravity has been shifted towards the tractor making it easier to lift. Even when the weight is removed the machine still have improved balanced against previous models.

Maintaining the new range of KORO[®] FTM[®]'s has also been enhanced to ensure working reliability. A modular setup allows the machine to run without belts and the strong state of the art driveline is maintenance free.

All of the range can facilitate the enhanced patented Universe® rotor which offers improved clean up and greater surface hygiene. Previous rotors will fit on the 2.0m and 2.5 models but not on the 1.2m or 1.6m









If you have any questions or require more information don't hesitate to get in touch, simply call +44 (0)1260 224568, email info@campeyturfcare.com or visit www.campeyturfcare.com

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