

What's in your Top Dressing?

Mick Higgins and Sasha McCann explain exactly what a top dressing consists of and how careful selection of the right material is essential.

Historically, top dressings for fine turf areas were produced on site by the greenkeeper using local sands and soils. These complimented the rootzone of the greens' construction as they were made from the same, or similar, materials. Over the years the game of golf has developed to the extent that courses are now expected to produce fine turf areas that can withstand play 52 weeks of the year. Hence, the vast majority of construction rootzones are now designed and produced by external specialists such as Rufford and Pro-Sport. As top dressings should match a rootzone profile, they too need to be designed and manufactured to the same high specification.



Sand grains under the microscope

However, whereas we have recommendations and guidelines for putting green rootzones from the United States (USGA) and later this year from the UK (STRI), there are no similar guidelines for top dressing materials. There have been numerous articles written on the subject of top dressings over the years, about how and when to use them. But do you actually know what goes into a top dressing and the measures taken to get it right?

For example, if you requested a 70/30 top dressing, would you actually know what is in the mix? What type of sand would you be adding in at 70%? Which grade of sand would you require - medium coarse or medium fine? Furthermore, what kind of organic amendment would you be adding in at 30%? Is it a sandy loam soil with low organic matter content or a sedge peat with high organic matter content? All of these considerations are fundamental to the way in which the top dressing, and ultimately the putting green, will perform.

CONSTITUENTS OF A TOP DRESSING

Irrespective of the blend ratio, i.e. 70/30, 60/40 (which is actually by volume and not by weight), the majority of top dressings produced in the UK would typically consist of:

| | |
|-----------------------------------|------------|
| sand (53 or 63 - 2000 microns)* | 90 - 99% |
| silt & clay (<53 or <63 microns)* | 0.5 - 7.0% |
| organic matter content | 0.5 - 3.0% |

*53 microns is used for American procedures, 63 microns is used for UK.

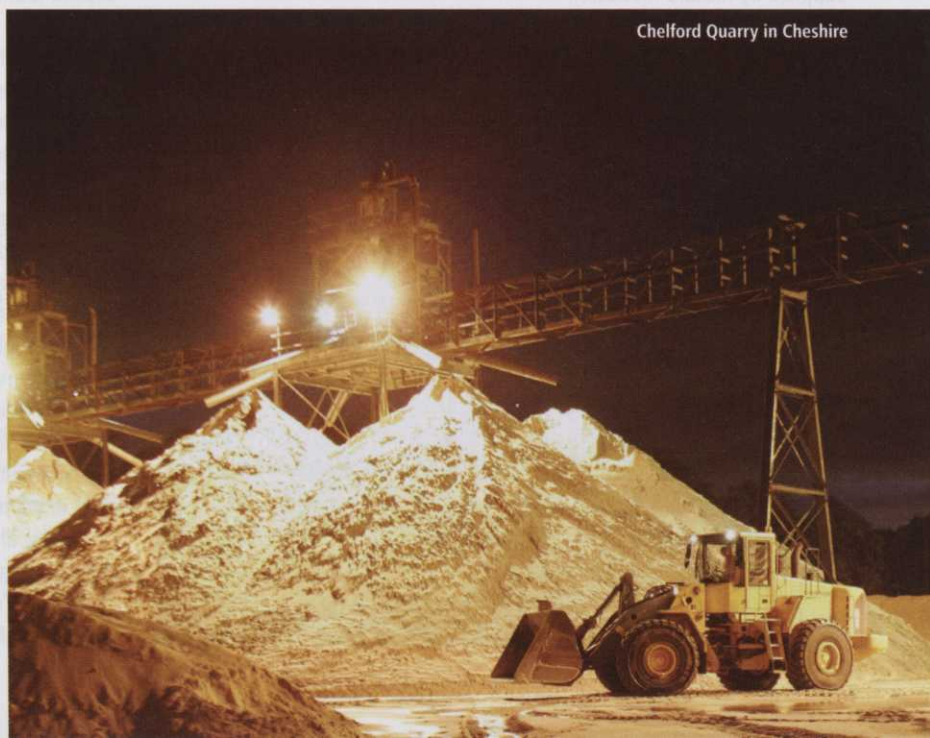
By reducing the percentage of silt and clay, water infiltration rates will increase. Higher silt and clay levels will also increase the possibility of greens being capped. Top dressing, in conjunction with other maintenance practices such as scarification or aeration, will help to control thatch. Therefore, a top dressing with a high content of organic matter will only add to any existing problems with thatch layer. The combined percentages of silt and clay plus organic matter content at 10% or less, results in over 90% of a top dressing consisting of sand.

SAND

The definition of sand is an inorganic mineral fraction between 2000 microns and either 53 or 63 microns (depending on US or UK specification respectively). A point to remember is that any organic amendment containing particles within these size fractions would also be classified as 'sand'. The chemical composition of sand in the UK is predominantly silica (SiO₂). Each deposit has its own unique mineralogy depending on how, when and from which mineral it was formed.

It is important to appreciate that not all sands are the same and, as it is the major constituent in a top dressing, care should be taken to ensure that the sand used has the desired physical properties.

Construction or building sands have a wide range of particle sizes, which can lead to a high degree of interpacking, resulting in poor drainage. Sands used for top dressing should have a narrow range of particle sizes with the majority of particles in the medium sand range, that is between 0.25mm and 0.50mm. This will help to reduce the impact of interpacking and offer the optimum balance for capillary and non capillary



Chelford Quarry in Cheshire



Sasha McCann at work in WBB Minerals' laboratory which has been a member of the USGA Proficiency Testing Programme for the past 10 years

By removing fine sand, silt and clay fractions drainage of the sand is dramatically improved. The processed sand is stockpiled and left to drain before being used in top dressing production.

Sands that have not been processed effectively are likely to be cheaper but when used in top dressings may not provide the desired results, specifically drainage. Even a top dressing that contains over 90% sand, when incorporated into a rootzone, may not perform as expected and could lead to capped greens or reduced infiltration rates.

ORGANICS

The most commonly used organic amendments for top dressing production in the UK are soil, peat and green compost.

- Soils can vary in texture from sandy loam through to heavy clay loam and in organic matter from 'sandy' to 'peaty' soils.
- Peat is formed by the partial decomposition of vegetation in acid, waterlogged conditions. Sphagnum peat is derived from sphagnum moss and sedge peat from sedge, a grass-like plant.
- Green compost is produced by the decomposition of recycled green waste.

It is not just the blend ratio, but also the type of organic amendment used that will determine the overall organic matter content of a top dressing.

QUALITY CONTROL TESTING

It is important to request up-to-date product information from your supplier. If they follow an internationally recognised quality control system, e.g. ISO, and participate in a proficiency testing programme, they should be able to guarantee consistency of their products.

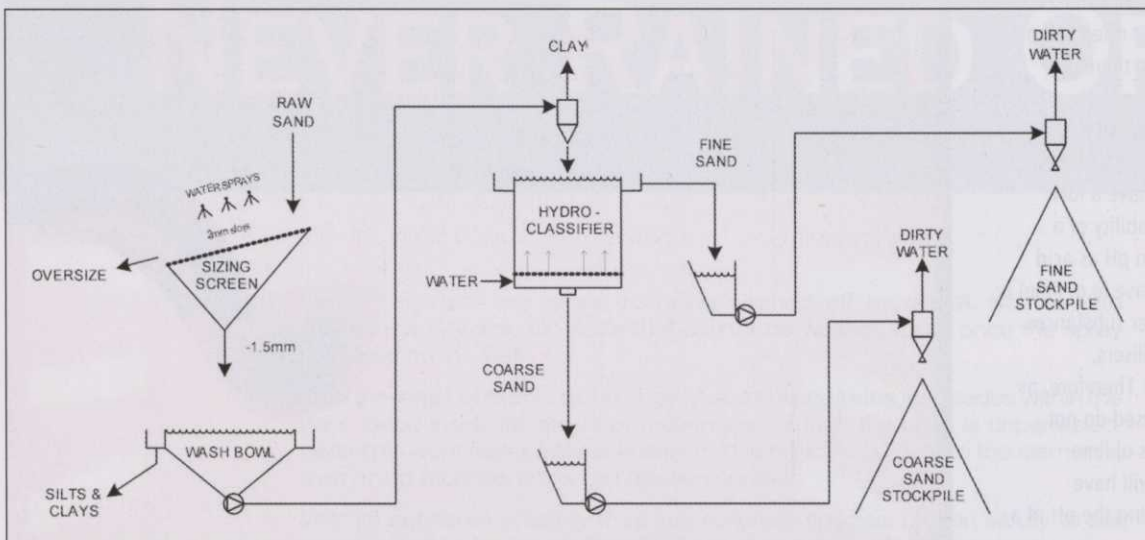
A proficiency testing programme consists of a range of samples being equally divided and sent to participating laboratories on a regular basis. All test data is collated to provide information on consistency of results within each laboratory. This information is also used to statistically compare test

results between laboratories. Laboratories that gain accreditation, i.e. a formal recognition that a testing laboratory is competent to carry out specific tests, through accreditation bodies such as BSI, CICS, UKAS, NAMAS or A2LA, should be utilised wherever possible.

A further measure of a laboratory's competence is participation in the USGA Proficiency Testing Programme that uses

ASTM (American Society for Testing and Materials) procedures. This is a requirement of A2LA, however you do not have to be A2LA accredited to take part in the USGA PT Programme. The current procedures cover testing for putting green and sports turf rootzone mixes. Top dressings are not specifically mentioned but these procedures are generally adopted.

The most common test that laboratories carry out on a top dressing is particle size distribution analysis. Samples must be washed and dried first to remove silt and clays otherwise grains may stick together giving a false (coarser) result. Individual grains are then sorted according to their size using a sieve stack.



The various stages of processing

water filled and air filled porosity levels required for healthy turf. When choosing a sand/top dressing supplier, it is important to interrogate and be comfortable with their quality control procedures. Do they operate within an internationally recognised quality system?

As an example, WBB Minerals' sands used for top dressing production are extracted from the quarry face and immediately screened to remove any oversize material (+ 1.5mm). They are then fed into the wash plant where they are vigorously washed to remove any silt and clay, before being hydroclassified. This continuous process involves segregation, by size, using an upward flow of water within an open topped vessel and results in a closely graded sand.



pH Testing

The particle size distribution of a top dressing should be compatible to that of the greens profile to improve or maintain its drainage characteristics. Coarse over fine may result in a surface that is nutrient deficient and has a low water retention; whereas fine over coarse may result in a surface which holds onto water with very little air-filled porosity.

Additional tests carried out on top dressings are:

- Organic matter content, which is based on the loss on ignition of an air-dried sample, is important to know where there is a thatch problem.
- pH or acidity of top dressings should be slightly acid or neutral for fine turf areas. Sand based top dressings have a low buffering capacity, i.e. the ability of a solution to resist changes in pH as acid (e.g. certain fertilisers) or base (e.g. lime) is added, compared with other substances used on the green, i.e. fertilisers, fungicides, irrigation water. Therefore, as long as the top dressings used do not contain significant amounts of lime (Calcium Carbonate) they will have negligible effects on changing the pH of a greens profile.
- Moisture content will help to determine its ease of use. Top dressings are easier to apply and integrate into the surface (brush in) when dried.

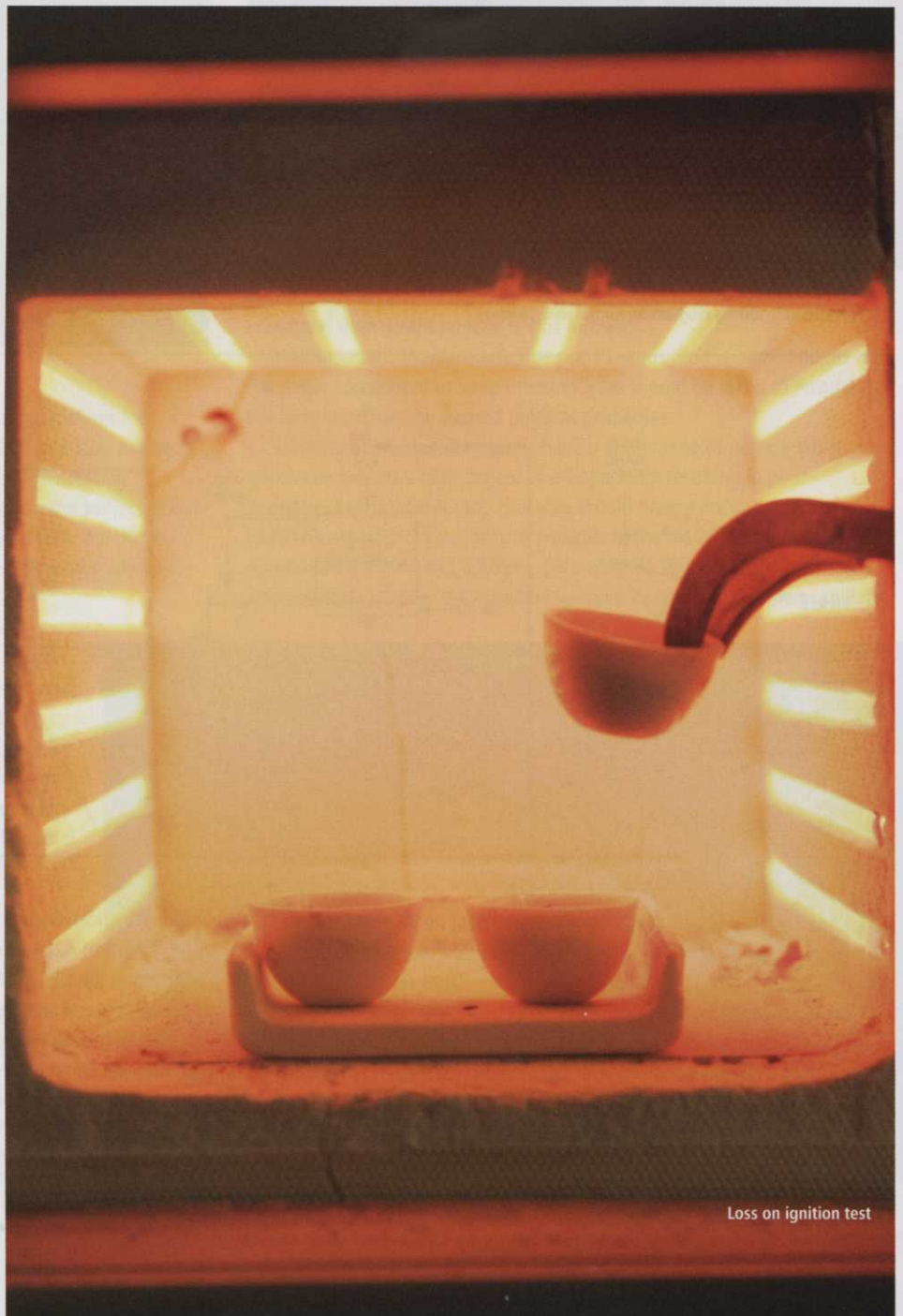
It should be noted that any test data obtained from analysis carried out using different procedures and/or equipment may give different results, so this should be taken into consideration whenever comparisons are to be made.

SUMMARY

Choosing a top dressing is not a case of 'one size fits all' as there is no single grade that is suitable for all applications. Asking for a 70/30 top dressing is no longer acceptable. It is necessary to know the particle size distribution of a green's profile in order to select the correct grade of top dressing. If this information is not known then samples should be taken and forwarded to a suitable laboratory for analysis. Based upon the results, a top dressing should be selected to maintain or improve the current profile.

If these steps are followed and the product is supplied from a reputable company, then this should pave the way for consistent, healthy greens for years to come.

Mick Higgins and Sasha McCann work for WBB Minerals and for further information on golf course construction and maintenance visit the Technical Pages at www.rufford.com.



Loss on ignition test