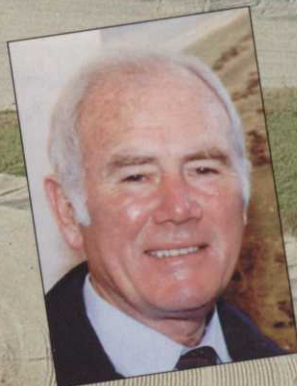


Q U E S T I O N :

What do these men have in common?



They all realise the benefit of BIGGA Membership



Rod Hunter, assistant greenkeeper at The Belfry: "I'm a member because BIGGA is the professional organisation for greenkeepers and as a greenkeeper it's very important to have an organisation that you can go to for help and information."

Here are the first 10 reasons for renewing your membership –

1. Greenkeeper International magazine

Twelve copies of the Association's official monthly publication are provided free to all greenkeepers as a benefit of membership.

The award-winning magazine has earned the reputation of being the professional journal for golf greenkeepers. Not only does it help you perform your job more efficiently, it also elevates the status of your profession.

Greenkeeper International includes in depth editorial features, an excellent recruitment section for greenkeepers looking for jobs, lively competitions and an exciting format guaranteed to maintain your interest throughout the year.



David Norton, head greenkeeper at The Belfry: "I joined because it keeps you in touch with all the important things, especially through the magazine. We are professional people and we need to be in a professional body."

2. Membership card

At the discretion of Golf Clubs, greenkeeper members can use their membership cards to enjoy the courtesy of the course. This privilege is only extended to Full Greenkeeper Members.

3. The sections

Every member is allocated to a section according to where they live or work in the country. Each section hosts a variety of events, such as golf days in the summer and lectures throughout the autumn/winter months. Regional seminars are also organised, providing a valuable educational opportunity for members in their own area.

Your section gives you a regular opportunity to mix with your peers and take part in a varied social and educational calendar of events.

Martin Lothian, head greenkeeper at Turnberry Hotel: "It's an advantage for anyone wanting to get on. For example, you pick up a lot of tips through the

magazine and at golf days."

4. Personal accident cover

In addition to capital sums to cover death, loss of limbs and eyes and permanent total disablement, there is a weekly income payment to members suffering temporary total disablement.

Additionally members enjoy access to a comprehensive range of insurance benefits at highly competitive rates.

5. Employment cover

(i) The defence of any claim brought against a member arising out of, or in the course of his employment.

(ii) The pursuit of a claim by an eligible member arising out of his employment, eg. unfair or wrongful dismissal.

6. Legal advice

Through a card facility, we offer a 24 hour telephone service to members and their immediate family to cover any type of legal problem that may arise.

7. Financial services

Independent advice over a wide range of financial services is available to members, with access to all the major life insurance and pension companies.

8. Membership package

Each new greenkeeper member receives an official Association tie and for the ladies a scarf embossed with the BIGGA logo. All members will receive a pen, a sticker and an attractive waterproof wallet in which to hold the membership card.

9. International members

We have an International Section with an ever increasing number of members as far across

the globe as Australia, USA, Thailand, Iceland and Turkey to mention just a few. All items of the membership package are available to International Members.

Users of the legal helpline card should note that advice will relate to either English or Scottish law. The card can be used when the member is visiting the UK, both for advice and in respect of any claims arising from such visits.

Carl Hernstrom, course manager of Ekerum Golf Club, Sweden:



"When I first joined BIGGA, it was because there was no greenkeeping organisation in Sweden. However today it's because Britain is the best place to see all the things that are happening in golf. I've learnt a lot through all the people I have met at Harrogate, the Open, the National Tournament and the National Education Conference."

10. Benevolent fund

– allowing for payments to members suffering particular hardships.

As Clare Douglas, BIGGA's membership services officer, points out: "These are only the first 10 reasons for renewing your membership. There are lots more advantages most importantly linked to education and training."

BIGGA has the future education and training of greenkeepers as its first priority

All greenkeepers have access to education and training through colleges, 'in house' courses or short regional based courses. The options available from colleges are at varying

levels, which can be categorised as:

- Craft, Supervisory and Management level courses - National/Scottish Vocational Qualification
- National Certificates and Diploma
- Higher Certificate and Diploma and Degree level courses.

BIGGA arranges 'in house' management and supervisory courses held at Aldwark Manor. These include both specialist short courses and management courses. Further information on all courses is available from BIGGA headquarters.

The National Education Conference, which is held in the same week as the BIGGA Turf Management Exhibition at Harrogate, is a major educational event. This provides an opportunity for members to combine the exhibition with an interesting and varied programme of speakers from home and abroad.

Seminar Programmes are arranged as part of BTME at a discounted rate for members. BIGGA Regions and Sections also arrange seminars during autumn and winter.

The Association awards the Master Greenkeeper Certificate which indicates that the recipient has reached the highest standards of excellence within the profession of greenkeeping. The award is designed to produce a well educated, experienced, practised greenkeeper, through a combination of credits awarded for

BIGGA 1995 SUBSCRIPTIONS STRUCTURE		
	New Members In 1995	Current Members if paying before 31 January 1995
Course Manager/Head Greenkeeper	£65	£60
Deputy Course Manager/Deputy Head Greenkeeper	£52	£48
First Assistant/Assistant Greenkeeper	£45	£42
20 years of age or under	£30	£27
Associate/Company (including one year's subscription to magazine)	£52	-
Associate/Company without magazine	£27	-
Corporate	£580	-
International	£52	-

education, experience and practical ability. Credits are awarded for successful completion of educational courses, attendance at the BIGGA National Education Conference and Seminar Programme, Region and Section Seminars and for amount of greenkeeping experience. Additionally candidates have their golf course operation assessed and have to pass the BIGGA Module Examination. The Certificate is considered the premier award in greenkeeping.

BIGGA also organises a competition to find the Premier Greenkeeper of the Year in conjunction with Zeneca. The winner wins a trip to the Golf Course Superintendents Associa-

tion of America Exhibition and Conference in the USA.

For the new entrants to the profession BIGGA organises the Student Greenkeeper of the Year competition in conjunction with Toro/Lely UK Ltd and the PGA European Tour. The winner of this contest visits the University of Massachusetts to study with US greenkeepers and the two runners up join the PGA European Tour greenkeeping team at two major venues.

For further information on any of these educational opportunities please contact Ken Richardson, education officer, at BIGGA Headquarters, Aldwark Manor, Aldwark, Alne, York, North Yorkshire YO6 2NF or telephone 01347 838581.

George Brown, course and estate



manager, Turnberry Hotel:
"With golfers of all levels demanding the highest quality of courses all year round, greenkeeper education is becoming more and more important. BIGGA is the body leading the way here, producing high quality videos, setting up a library, running regular management courses, regional seminars and, of course, the National Education Conference."

Associate

THE BIGGA RECOMMENDED MINIMUM SALARY/WAGES SCALE, 1995

The Association has updated its recommended minimum salary/wages scale, although actual figures remain the subject of negotiation between the Golf Club and Greenkeeping staff. Quoted rates apply from January 1, 1995.

	18 Holes	27 Holes	36 Holes
Course Manager/Head Greenkeeper	£19,144	£20,867	£23,354
Deputy Course Manager/Deputy Head Greenkeeper	£13,818	£15,057	£16,842
First Assistant	£230.00 pw	£230.00 pw	£230.00 pw
Assistant Greenkeeper	£216.30 pw	£216.30 pw	£216.30 pw
Apprentice Greenkeeper (all courses) Age 16/17: £108.15 pw; Age 18: £135.20 pw; Age 19: £162.23 pw; Age 20: £189.27 pw; Age 21+: £216.30 pw.			

NB: Where appropriate these rates should be increased to reflect Regional variations up to a maximum of 24% in the South East Region.

The First Assistant is a post designed to recognise a third-in-charge where appropriate to the size of the Club. In cases where the First Assistant is the recognised Deputy, the appropriate Deputy Course Manager/Deputy Head Greenkeeper salary scale should apply.

Staff in possession of recognised qualifications should have this reflected in an addition to basic salary.

Basic conditions of employment should include:

1. Where accommodation is provided by the Club, it should be rent free with heating/lighting costs borne by the Club. The Club should compensate for Council Tax Liability.
2. Where accommodation is not provided by the Club, a suitable remuneration in addition to the above salary should be paid.
3. 40 hour week.
4. Retirement Pension Scheme.
5. Telephone costs on Club business.
6. Mileage allowance.
7. Time off to attend lectures, demonstrations, BIGGA functions and tournaments.
8. If not salaried, basic overtime to be paid at time and a half, with double time on Sundays and Statutory Holidays.

Explanation

The recommended salary and wages scale effective from January 1, 1995 has been revised with reference to the Tax & Prices Index which reflects changes in retail prices, PAYE and NIC. The index therefore represents the changes in gross income which would maintain the level of real net income.

The recommended increase for 1995 has been calculated using the latest available figure for 1994 with an adjustment for the shortfall in the recommended rate for 1994 when compared to the actual Index change for the preceding year.

It is proposed to adopt this formula for future years.

Increases in the cost of the two main membership benefits, Personal Accident Insurance and Legal Helpline, have principally accounted for the increase in membership subscriptions. The Course Manager/Head Greenkeeper rate has risen by a greater proportion than other rates to part reflect the percentage difference in recommended salaries for this category of employment when compared to a Deputy Course Manager/Deputy Head Greenkeeper. In 1996 it is intended to fully reflect the percentage difference applicable at that time.



Benefits too with Associate/Company Membership

Associate

This category is for those having a close interest in greenkeeping without being specifically employed as greenkeepers. This category would therefore interest chairmen of greens committees, club secretaries, golf course architects and constructors and many others with a close affinity to greenkeeping.

Company

This membership is available on an individual or corporate basis for any persons employed within a company connected with greenkeeping or fine turf management.

Terry Ryan, Rolawn's sales and marketing



director: "As the major producer of cultivated turf in the United Kingdom Rolawn views membership of BIGGA as essential because it gives us direct access to the ideas, views and opinions of the greenkeeping community. BIGGA manages to combine professionalism with old fashioned courtesy. The organisation is a pleasure to deal with."

Benefits of membership

Greenkeeper International magazine

Twelve copies of the Association's official monthly publication are provided free to all Associate/ Company members as a benefit of membership.

The award-winning magazine has earned the reputation of being the professional journal for golf greenkeepers, which is the reason why the industry trusts and relies on it. Greenkeeper International is the "vital title" to keep you up to date with all the latest developments in the industry. Not only does the magazine help greenkeepers perform their jobs more efficiently, it helps elevate the status of the whole profession.

Corporate membership is available at a discounted price for companies who have 12 or more key personnel that would benefit from receiving the magazine.

The sections

All Associate/Company members are allocated to a section according to where they live or work in the country. This enables you to join in all section events, such as golf days in the summer and educational lectures throughout the autumn/winter months.

For company members this provides a relaxed and informal opportunity to socialise with greenkeepers in your area.

Associate members will also benefit not only from having a regular opportunity to mix with your peers but also from the educational aspects that the sections provide.

Reduced delegate fees

Delegate fees for all big events are offered at a discounted rate to all Associate/Company members. These include:

- ◆ The BIGGA Turf Management Exhibition (BTME) and Educational Seminar Programme held in January each year at Harrogate, North Yorkshire.
- ◆ The National Education Conference which is a two day event held at the same venue. Again, the delegate fee will be discounted.
- ◆ Members can also take advantage of educational opportunities through regional seminars.

Membership certificate

All members are issued with a certificate of membership, which has to be produced to participate in sectional and national events. This certificate does not allow Associate/Company members to seek courtesy of the course - this is a privilege extended to greenkeeper members only.

Membership package

All Associate/Company members will receive the Association's lapel badge, a pen, a sticker and a waterproof wallet.

International members

BIGGA is truly an international association and we have a section for International Associate/Company members. All items of the membership package are included for international members and the magazine is sent at no extra charge to wherever you live in the world.

Terry Adamson, sales rep for Gem

Professional: "I like this industry and I like being involved in it. I used to be a greenkeeper and I still like to be involved, especially with the educational and social programmes, which are BIGGA's biggest asset. Gem Professional believes that we're all in this industry together, we work as a team, there is no distinction between them and us."

Join the British and International Golf Greenkeepers Association

Thank you for making the association what it is today. The membership has now more than quadrupled since BIGGA was formed in 1987, with current membership at over 5,500.



Paul Pearse, course manager Stockport Golf Club: "Greenkeepers need a professional body to support them. The more members we have the stronger the Association will

be and the stronger the support will be."

If you are already a member, you have nothing more to do at this point other than looking out in your mail later this month for the 1995 membership renewal pack.

If you are not currently a member, but you are now thinking of joining the Association, please complete and return the membership application card in this magazine.

For any further queries please contact Clare Douglas, membership services officer,

BIGGA, Aldwark Manor, Aldwark, Alne, York YO6 2NF, or telephone 01347 838581.



Walter Woods BEM, links supervisor, St Andrews Links: "The British and International Golf Greenkeepers Association provides the stepping stones for education and knowledge and promotes opportunities for the improvement of individual skills applied to golf courses."

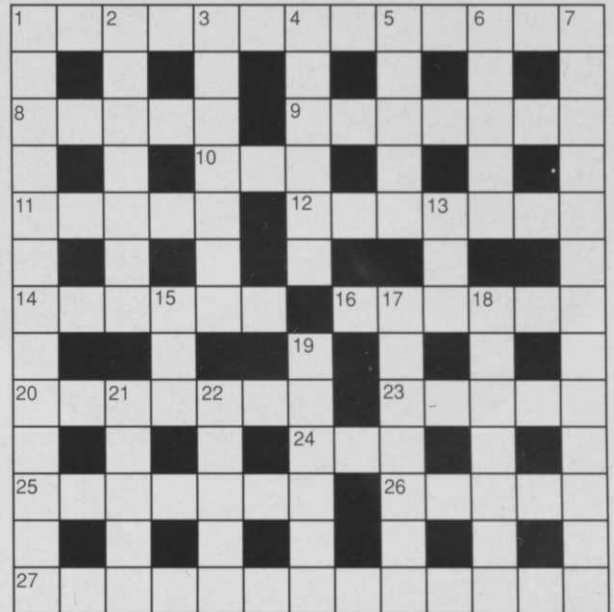
10 TIPS FOR SAFE TREE WORK

1. Always wear a hat. Things are constantly falling from trees as you work on them. It may only be a small branch but if it's coming from 50ft up, it can put you in hospital.
2. Protect your eyes and ears at all times. Small branches will poke your eyes, and blowing sawdust and woodchips are a constant irritation. If you get something in your eye just before you finish a major cut, you could be in big trouble. Chainsaws and chippers produce sound levels above 100dB, so be sure to wear hearing protectors to avoid hearing damage.
3. Wear chainsaw-resistant trousers, gloves, jackets and boots. They can reduce the chances of serious cuts.
4. Don't work too closely with a colleague. You should be at least 10ft apart when working with saws. And make sure no one is in the fall area when cutting branches and trees.
5. Use the proper stance, grip and position when using a chainsaw, ie. right hand on the trigger, left hand on the upper handle, left thumb below the handle, chain to the right of your arm, feet solidly on the ground.
6. Examine the tree carefully from the root up before climbing it. Check for power lines, structural defects, etc.

7. Check all your equipment. Make sure the saws are sharp (sharp saws are more dependable and less tiring), check ropes for wear, check ladders, etc.
8. Follow basic climbing rules. When tying in to the tree, put the line around the main trunk or stem. This way, if that limb breaks, you will fall only the distance to the next limb, not all the way to the ground. When climbing a tree, spread your body weight over at least three points, eg. avoid having both feet or hands on the same branch. Lines should be half-inch diameter with a breaking strength greater than 5,400 pounds. The metal links should be steel, not aluminium, with a breaking strength of 5,000 pounds.
9. Use ladders wisely. Extension and A-frame ladders are useful for getting into trees, but you shouldn't work from them. They are not stable enough to withstand rapid movement or being hit with falling limbs. You can use A-frame ladders for pruning hedges or small trees that won't support a climber.
10. Don't stand beneath the limbs you are cutting with pole runners or pole saws - stand to the side but remember, limbs fall tip first then flip back at you when they hit the ground.

GREENKEEPER'S CROSSWORD

Compiled by Mark G Smith



WIN A BIGGA BLAZER OR £50 IN CASH!

CLUES ACROSS

- 1 Commercial exhibition area at golf tournaments (6, 7)
- 8 Bob, USPGA Tour professional, winner of the 1994 Texas Open (5)
- 9 Some clubs do it to the hole as a concession to winter conditions! (7)
- 10 St Andrews' Golf Course opened in 1895 (3)
- 11 Sheep's Fescue, (L. Festuca) (5)
- 12 Regularity of green's cutting in summer (4, 3)
- 14 Height of cut in winter compared with summer (6)
- 16 Tynning, Aerating operation where plugs are removed from greens, tees etc. (6)
- 20 Type of dismissal warranted by acts of gross misconduct (7)
- 23 "..... Slap", 15th hole at Carnoustie, recently depicted on the 30p stamp (5)
- 24 Egg, when taking in from 11 across (3)
- 25 Lightly strike the flag stick (4, 3)
- 26 Hardy deciduous tree genus from Germany's sapling, known as "Tupelo Gum" (L. Aquatica) (5)
- 27 Golfers who play for a living (13)

CLUES DOWN

- 1 Biennial match between lady professional golfers of Europe and America (3, 7, 3)
- 2 Physical means of keeping rabbits, badgers etc. at bay (7)
- 3 To trap animals (7)
- 4 Watcher of televised golf (6)
- 5 Common name of the shrub (L. Syringa Vulgaris) (5)
- 6 What greens are in the period following 16 across (5)
- 7 How often 1 down is played (5, 3, 5)
- 13 Sutton, 1983 USPGA champion known as the "bear apparent" (3)
- 15 The strike in golf (3)
- 17 City in Florida where the USPGA Nestle Invitational is played (7)
- 18 Coastal change, for the club where the USPGA's Tournament of Champions is held (2, 5)
- 19 Usually removable from bunkers under the local rules of golf (6)
- 21 County of Western Ireland containing Enniscrone, Strandhill and County golf courses (5)
- 22 Common fruit tree (L. Pyrus Malus) (5)

★ Solve the crossword puzzle and you could win either a BIGGA blazer (worth £87.95) or £50 in cash! Send entries to: Crossword Competition, Greenkeeper International, Aldwark Manor, Aldwark, Alne, York YO6 2NF.

Closing date November 24, 1994. First correct entry drawn after the closing date will win the prize. Photocopy your entry if you don't want to cut up your magazine. → Last month's solution:

October winner: Gareth Roberts, deputy course manager, Hankley Common Golf Club. September winner: Alasdair McLaren, course manager, Abernethy Golf Club

Name:

Address:

If I'm the winner, please send me £50 cash or BIGGA blazer, size

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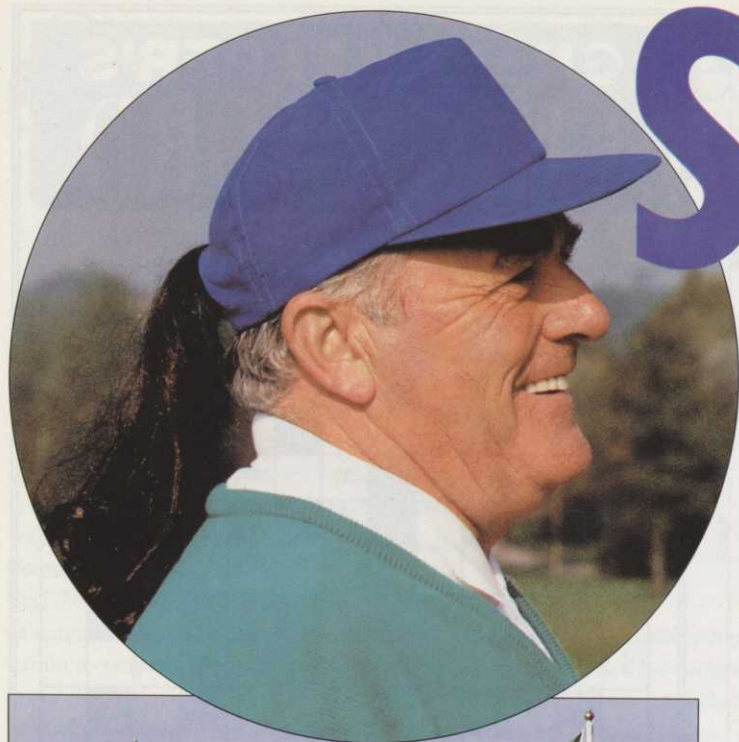
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Second



The greenkeepers notched up a rare defeat in the Kubota Challenge Trophy. Chris Boiling reports from The Belfry

Drubbed. Trounced. Thrashed. Destroyed. Annihilated. Whipped. Licked. Walloped... There are some great words to describe defeats, and this was a great defeat.

Everyone expected the greenkeepers to retain the impressive Kubota Challenge Trophy. After all, they'd won it eight out of 11 times, and in the semi-final of this year's event at The Belfry they whipped the English Golf Union 6-2. But the Golf Foundation were also on form. They knocked out the Secretaries, the only other team to have won the Kubota Challenge, by the same margin.

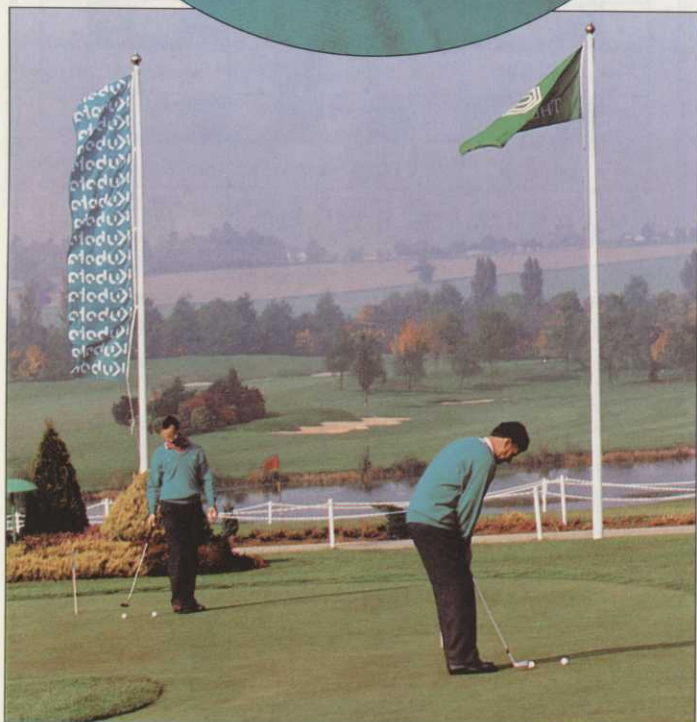
It was clear early on in the final that the Golf Foundation weren't going to be charitable to the greenkeepers. Paul Pearse came in after nine holes five down. Paul Loffman was three down. John York and Dean Cleaver were both four down. Only Duncan Gray and Bert Cross were up, by one hole. Malcolm Lathan and Roger Tydeman were all square.

Over the second nine, Paul Pearse staged a magnificent comeback and was standing on

the 18th tee all square. Then he drove into the water... Malcolm Lathan, in the match behind, offered the greenkeepers' supporters (well, me and BIGGA chairman John Millen) a glimmer of hope by posting a 3/1 victory. Then came defeat upon drubbing upon disaster. Duncan Gray squandered his lead and lost 2/1. Paul Loffman never recovered from his early mistakes and lost 3/2. Bert Cross lost by two holes. Roger Tydeman let things slip over the back nine and lost 4/2. John York never stood a chance against his opponent and did well to lose 4/3. Dean Cleaver was beaten 3/1.

This meant that in this competition's 12-year history, the greenkeepers had played 24 matches and now been beaten four times. Ah well, I suppose it's not a bad record.

While the boys were pondering this afterwards in Kubota's tent by the 10th tee, we were given a clue as to why the Golf Foundation won so convincingly. Organiser Peter McEvoy, twice British amateur champion, was challenged to drive across the water to the green on the short par 4



Pictures:

Top: hair we go - trend-setter Bert Cross

Above: Roger Tydeman and John York practising - obviously not hard enough!

Near right: Paul Loffman at the first hole

Right: Malcolm Lathan sinks a birdie putt on the 9th hole to square the match at the halfway stage. He was the only greenkeeper who went on to win



best



10th. During the competition only Paul Pearse had made it to the putting surface. Peter had two attempts and failed. Then Golf Foundation's 15-handicap teenager Phil Cotton, whose father is a pro, had a go – and promptly smacked his ball on the green with a 3-wood.

One consolation for the greenkeepers is that they won the Drive and Pitch competition. Mind you, losing that would have been an even bigger embarrassment than losing the Kubota Challenge since it involves driving a tractor through an obstacle course and pitching into a bucket. The greenkeepers were handicapped by having larger tractors and Duncan Gray, whose hobby appears to be collecting cones. But at least he didn't crash his tractor into a barrier – that was left to Kubota's Brian Hurtley.

In the other match the Secretaries beat the English Golf Union 4.5-3.5.

KUBOTA CHALLENGE

- 1 Golf Foundation
- 2 Greenkeepers
- 3 Secretaries
- 4 English Golf Union



**Pictures: Top: Paul Pearse stages a magnificent comeback – until the 18th
Above: They think it's all over – it is now. Duncan Gray loses the 16th
Right: Paul Pearse – a study of concentration
Below: John York shows Phil Cotton how to take a divot**



Peter Oakford goes through the reasons why a machinery care programme can pay handsome dividends

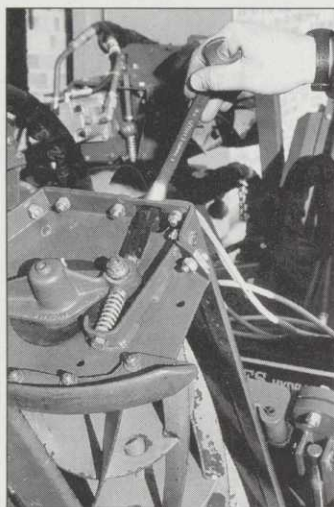
MACHINERY

With machinery, especially grass cutting equipment, being used less frequently over the next few months, now is the ideal time to address the question of maintenance and overhauls. By being aware of the what can cause problems, steps can be taken both now and throughout next year's cutting season to limit the possibility of any down time. This feature aims to highlight the kind of things that can create problems. By being aware of these, action can be taken to stop them occurring in the future.

A comprehensive look at the maintenance schedules for the vast number of machines found on golf courses is not practical, so in the case of a specific machine the manufacturer's handbook should be consulted.

Heat

When two surfaces are rubbed together, heat is generated from the friction that is created. In the



Adjusting a cutting cylinder down onto the bottom blade on one side of the cutting unit of a hydraulic trailed gang mower

case of metal, if this process is carried out long enough, fusion will take place. This is what happens when an engine seizes-up.

The problem is how to reduce

the friction and dissipate the heat. Apart from the actual design of the components, the answer is use of oil, grease, water and air.

Oil and grease

By creating a film of oil or grease between the two surfaces the heat level is reduced. If this lubrication protection breaks down, either through shortage or deterioration, then problems start to occur. Likewise contamination with an abrasive material will result in the metal surfaces either being damaged or worn away. From this, the important areas to watch can be identified.

All oil reservoirs, such as sumps, need to be inspected regularly to ensure that they are maintained at the correct level.

Temperature fluctuations reduce the lubrication qualities and the oil becomes dirty.

Watering down of the lubricant can occur due to internal engine condensation.

To counteract all these requires a maintenance programme that includes constant monitoring, i.e. checking the level on the dipstick, and regular oil changes.

Oil filters

If these are fitted they will need replacing periodically.

The recommended intervals between oil and filter changes will be found in the machine's handbook.

Cleanliness is important always, so steps need to be taken to ensure dirt does not enter the machine through the fillers or dirty funnels.

In the case of grease there are other aspects to take into consideration.

This mostly enters the lubricating area through a nipple, and is often enclosed in a chamber where it performs its function. Unless it leaks-out, the volume of grease is constant for a considerable time, so pumping in a fresh supply under pressure can push seals or bearings out. Any excess also tends to find its way out through the nipple or between the bearings, where it attracts dirt, sand and other abrasive substances. A lack of this vital compound causes excessive wear of shafts, and dried out bearings finally collapse. Check all grease points are functioning correctly,

then use a grease gun with controlled enthusiasm.

Water

Another way of controlling the temperature is the use of water. On amenity equipment this is mainly found on diesel powered units, although there are some petrol engines that use the system. In the environment where such equipment is used, dust and dried grass are common problems.

For a water-cooling system to work effectively air must pass freely through the radiator. If the flow becomes obstructed, then the water temperature rises and the engine starts overheating. Pre-cleaning screens are standard on most models. These need to be inspected and cleaned regularly, especially in dry conditions. The use of high pressure water or air to clear debris between radiator cooling fins is not recommended.

The system must be flushed and the manual will detail how often this is carried out and the procedure used.

Air

This performs two functions as far as an engine is concerned.

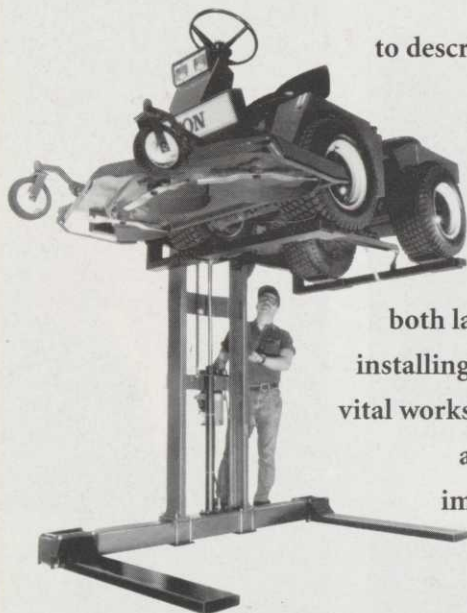
Firstly, like water it acts as a cooling agent. Most small engines are kept at the correct running temperature by cold air being drawn in by the flywheel across a series of fins sited around the cylinder block. The same system applies to hydraulic pumps and motors. If the channels between the fins become blocked and the passage of air restricted then the unit will run hot. It is important to remove any debris from between the fins, cowlings and guards, so that the correct running temperature is maintained.

The second use of air is in the combustion process, which cannot take place without an adequate clean supply. All engines have some form of air filtration. This is usually a foam or paper element – or in rare cases an oil bath. Whatever system is used it must be kept clean. The manual will outline the intervals at which air filter maintenance should be carried out, but in very dusty conditions they need checking much more often. If an element is heavily contaminated, worn, or damaged then fit a new one.

This space is far too small

to describe the benefits of installing a HEFTEE Lift into your workshop. Golf Courses both large & small are installing HEFTEE'S as a vital workshop tool which also satisfies the important Health & Safety requirements.

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MAINTENANCE

Fuel

Where equipment is not going to be used for a relatively long period then the fuel system needs to be drained. Not only does fuel go stale, deposits also form in the carburettor and pipes and when the time comes to use the machine, a full cleaning down of the fuel system will be required.

It is vital that clean fuel is used. Failure to ensure this can result in wear of internal components, poor starting or loss of power.

Spark plugs

An engine's performance hinges on this vital item. Modern electronics will ensure a perfect spark every time, so transmitting this to the combustion chamber relies entirely on the condition of the spark plug. Because of its position, it is a good indicator of what is happening inside the engine. Problems can develop and more often than not these are attributed to carbon deposits. These then

become a path for electrical leakage. Insulation deteriorates and the spark is weakened, or in acute cases is non-existent. These situations can be avoided if the cause is identified.

The following outlines the type of conditions that lead to a carbon build-up:

1. A badly adjusted carburettor results in incorrect fuel mixture. In this case the setting would be too rich.
2. Over-use of the choke, or one that does not fully disengage.
3. Blocked or dirty air filters stop air reaching the engine. As a result the ratio of air-to-fuel mixture is altered.
4. Bad insulation within in the ignition system.
5. Wrong spark plug fitted.
6. Incorrect plug gap.
7. Engine timing is out.
8. A compression loss occurs due to damaged or worn gaskets, valve seats, or piston rings.
9. Extended running at low revs.

10. Fuel leakage during transportation. Some machines are not fitted with fuel taps. Neat petrol by-passes the carburettor and enters the combustion chamber where it evaporates leaving a sticky carbon deposit.

Any combination or one of these points can create a carbon problem that once established can only be rectified by de-coking the engine.

Fitting the right spark plug is important. If the reach is too short then carbon builds up in the recess created. In the case where it is too long there is the chance that the tip will hit the top of the piston or valves.

Transmission systems

Gearboxes and hydraulic units

Fluid levels need to be checked regularly. Where filters are fitted, these will require replacing according to handbook. It is essential that the correct grades of lubricant are used. If there are

any tell-tale signs of leakage on the storage area floor an investigation is needed immediately.

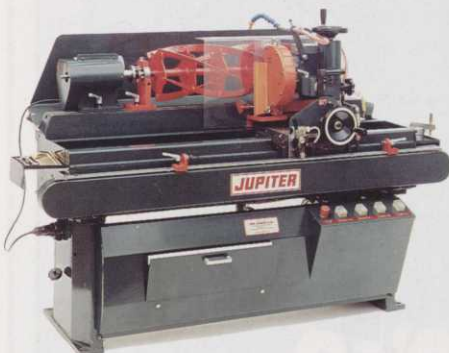
On units with cooling fins it is important to keep the channels free of dirt and dried grass. If a fan is fitted, check the drive to ensure it is operating correctly.

All hydraulic components are manufactured to a high degree of precision, so it is not advisable to carry out any repair that could introduce a minute foreign body into the system. Any work carried out on these units needs to be under clinical conditions. It could be a very expensive exercise, unless you can provide the right facilities plus technical expertise. If a problem occurs in these, a transmission system experts should be called in.

Having looked at the different areas that contribute to a machine's smooth and efficient performance, we now turn to other components that require attention. → Page 21

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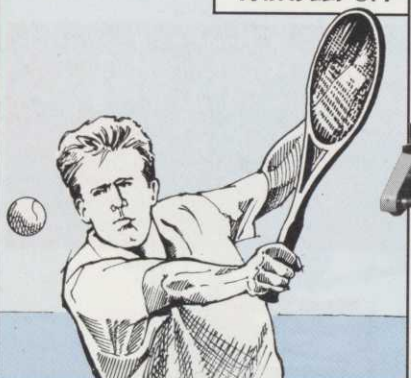


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