# A Factual insiders Guide to the Pure Water Fed Pole Cleaning Industry for the Beginner and seasoned veteran

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## Chapter One

#### Introduction to the basics of the Industry in the UK

The traditional methods of cleaning windows have been practised for decades and still play an important role today for the professional cleaners. It is not confined to the "one man band". The biggest and most serious companies still clean this way under certain circumstances and always will. Why? Because it's generally accepted as the best way to clean glass when it's in front of you at arms length. The traditional methods are what we have all been used to seeing during our lives, normally amongst the residential cleaners. This is namely the ladder, hand held soap applicator, hand held squeegee and the cloth "scrim". This is accurate, thorough and quick.

However, it is also well known that this trade is "a highly risky" way to earn a living. There are many deaths each year and hundreds of serious life changing injuries caused by falls from ladders whilst cleaning windows. The industry was not regulated until the 1990s and even then, enforcement has been too slow to gain any seriousness. Today, this has all finally changed, and due to pressure from legislation, insurance demands and general health and safety awareness, the professional windows and glass are still often traditionally cleaned and even windows from cherry pickers receive this treatment, it is now the "Water Fed Pole" age.

The extendable pole is now used in place of the ladder to keep the operators feet on the ground. The Water Fed Pole is just that. Pure Water is pumped up the pole from the ground based water purifier and the wet brush head systematically cleans the glass, rinses and leaves to dry completely free of spots, streaks or any residue.

This now meets the health and safety needs of authorities and cleaners alike and has undoubtedly saved numerous lives and injuries. It's here to stay for some time to come, so get used to it, accept it and hopefully profit from it, as it has now opened up the trade to a much wider demographic of business people.

This idea originated in the USA, where cleaning with alloy poles had been an established work practise for many years. As water treatment products became cheaper and were effective, the two were combined and the industry was born. Today, there are a variety of makes and models of purifier and poles used by tens of thousands of cleaners, but still all have the fundamentals in common. The water is purified in the same processes and the poles range from ground to approximately 6 - 7 stories high. The prices and qualities of course also vary massively and you will find detailed guidance and answers to all the questions and facts that really matter about this business in the following chapters.

For the past 13 years, I have been designing, manufacturing and selling the equipment in its various stages of evolution. I have experienced every scenario, question, painful lesson and it has all been condensed here for you. Whether you are a seasoned veteran or a first time investor in this industry, you will learn something of value that will ultimately increase your profitability or at least warn you of the expensive mistakes being made every day by the members of this fraternity.

I would love to hear from you if you would like any further information or questions answered. My personal contact details can be found in the resources section of this book.

## Chapter Two

#### Why would you want to clean this way in the first place?

The concept of high level cleaning is simple, feasible and we can see clearly where the profit comes from. We even have a reasonable estimate of how much we can earn from this type of work. This makes it all the more appealing. There are two main types of people that would adopt Water Fed Pole cleaning. Firstly, existing window cleaners and secondly, non-window cleaners. Let's address each in turn.

#### **Traditional Window Cleaners**

These people are already cleaning windows very effectively. They know what they're doing and have developed a specific skill. But they know that these are changing times and they are under new pressures they didn't have to deal with ten years ago. The main factor is safety. Whilst many of these guys are professional and smart with the way they clean, there are many that are not. Consequently, this is now defined as a high risk occupation and the health and safety movement has taken an interest and now rides on the back of legislation that has banned working from certain heights off ladders. Insurances are now more expensive or even prohibited regarding cover for working from ladders and this is seriously effecting the freedom of work practises for the window cleaning contractor and others of the same Ink.

The Water Fed Pole answers these issues. The operator's feet are on the ground throughout. The risk of falls become almost negligible. The issue of insurance cover for the cleaner and the client is now resolved and onwards they go. Additionally, more and more cleaners are not prepared to experience a second or third fall injury as they age especially as they see a future crippled by injury as a possibility.

The safety and inspiration of new practises is the greatest factor but there are others. The speed at which the work is done is definitely higher. It is generally accepted that time can be halved or at least reduced by 40%. This is certainly the case commercially and many residential cleaners agree that it cuts down time on the glass. Less time, more jobs – more profit. Or at the very least, same return for less time and effort. A welcome lifestyle trade off.

Another factor is staff. This is not a skilled job! There is a knack to it – yes. You need full fitness and use of your physique. But a few hours instruction and the operator is making money for you. In a couple of weeks, he's as good as it gets. Your investment in training your staff is minimal – your return's, high.

So to summarise, it is safer, legal, faster, more profitable and easier to delegate and consequently replicate your business work units. The residential cleaning area is the only area that this still can be seen (other than ground floor commercial) but it's just a matter of time before this becomes just too difficult to continue with.

#### **The Non-Window Cleaners**

The two main categories here are the contractor that deals with the typical type of commercial customer but far different services i.e. facilities management, internal cleaning, building services and the man on the street who just fancies the lifestyle and potential rewards and is prepared to invest for a chance to make it work.

## **The Contractor**

This makes the most sense of all. The contractor already has the clients, for something else, and often has the advantage of "insider" knowledge about expenses and profitability. He can see the *Return On Investment (ROI)* very clearly. Often just one job or contract creates profit over and above the equipment costs and it's all worthwhile in a short period of time. The

Equipment is then used across a lot of other jobs and helps give the company kudos and increases the growth opportunities and potential. It is said that it is many times easier to get work from existing clients than trying to find new ones and this kind of approach will generally bode very well.

## The Water Fed Pole Virgin

The perceived ease of entry into this marketplace for a completely new starter is not inaccurate. It just takes a little research, a little capital and a little guts and you can be out cleaning and earning in days.

The Water Fed Pole method of cleaning will often attract a slightly different type of small businessman. The potential for unlimited growth feeds the ambitious side. The technology attracts those who value innovation and have a natural respect for processes and interesting equipment. Even the air of mystery that surrounds "Pure Water Cleaning" contributes to the speciality of the service. This translates into higher fees and higher earnings. You get none of this with a scrim and squeegee.

This is of course, like the others, a very safe way to work, now that ladders are out of the equation, or at least so it seems.

The most common concern is the "route to market".

"How do I get the business?"

This too, is easily seen as the customers are you and I. Even a poor effort leaflet dropping will deliver some results and the referrals will start to generate revenue continuously. However, if you have a flair for Marketing and Sales, you will increase your income rapidly – way above the average competitor!

Put to one side the earning potential, the pride of seeing something flourish by your own hand and the security of a mass marketplace. The most common "positive" expressed by cleaners is the lifestyle freedom this type of work provides.

It's such a breath of fresh air if you have been an employee for years and suddenly you choose your hours and who you work with and for!

## **Chapter Three**

## Understanding the Science of Pure Water Cleaning and how you can use it's natural powers!

The chemistry of water alone is a vast subject with many connotations and effects, so I have tried to simplify the descriptions as best I can. Please forgive me if I have not accurately addressed some of the more "involved" questions you have. I would however, be very happy to answer in great detail any questions you have if you send them on to me in the future.

## <u>H<sub>2</sub>O</u>

Water is of course otherwise known as  $H_2O$ . This being a molecule (more than one atom connected together) made of one Oxygen atom and two Hydrogen atoms. It is relatively a small molecule as well. A lot smaller than the atoms or molecules (compounds or chemicals) that can dissolve in it. This size is important as we will see later when discussing filtration.

This molecule has a very important characteristic. It is what we call "Polar". Just like the earth has two separate and opposite poles, North and South (magnetic opposites), there is an electrical version of this polarity which we describe as "positive" (+) and "negative" (-). You will be familiar with the positive and negative terminals on a battery. That is the same electrical polarity that the water molecule experiences.

An atom (Hydrogen or Oxygen) has positively charged protons (nucleus – centre) and negatively charged electrons in a "cloud" type arrangement around the centres of the protons.



Now, these electrons tend to gather towards one end of the water molecule, leaving more on one end than the other, so the crowded side has an excessive negative electrical charge, leaving the other end or side more positive.



Fig. 2

This results in a <u>Polar</u> body of atoms (molecule) that start to attract the opposite poles of the other water molecules on all sides.



So these inter molecular attraction pulls all the molecules together making a denser crowd. This results in water as we see it. It is quite heavy and difficult to separate or disperse. This polar quality makes water quite unique within its family of similar molecules because it would be expected that  $H_2O$  would be a gas like  $CO_2$  (Carbon dioxide) or  $O_2$  (Oxygen). The attraction or link between each water molecule is called THE HYDROGREN BOND. It has a lot to answer for!

#### What's IN Water?

Well  $H_2O$  of course. But when we ask that question, we don't really mean that do we? We know "there are all sorts in the water". So let's use what we learnt about the structure of water and go deeper. What we are asking about is what is in between or amongst the water molecules. Generally, we can divide these things into two types.

The first is the things that are not actually dissolved in the water. They may appear as if part of the water, but in fact they are very small fine particles of a substance that have dispersed evenly throughout the water and often discoloured or changed the appearance of the water. For example, a muddy puddle of water or a cloudy pond, look the way they do because of tiny dust like particles held between the water molecules. The water molecules are unchanged and the mud or dirt is unchanged. They are just mixed together like different coloured marbles. In some cases, the polarity of the water contributes, but let's just keep this simple!

Even milk is a similar arrangement, except that the white fat globules are liquid not solid like dirt or mud. They produce a similar appearance but are called a suspension and unlike the solid particles, normal filtration will not separate the water from the fatty oils. So this first type of situation is when the substances in the water can be physically removed by filtration or settle out, if left standing. They have not changed their structure or the structure of the water. This is not an <u>aqueous solution</u>.

The second type of situation is when the substance in amongst the water molecules is actually physically changed in state i.e. from a solid (lump of sugar/salt) to a liquid state. This can not be filtered or separated as in the first example. The solid has broken up and each individual atom or molecule is now surrounded by water molecules. The polarity of the water has caused this.



This has happened because the substance has an electrical polarity of its own, but this time, when out of water, it creates a crystal (salt). This crystal is held together by electrical charges, but when placed in water, the negative parts of the solid are torn away by the positive ends of the water molecules and the positive parts of the solid get the same treatment from the water molecule's negative ends. We call this dissolving in water and forming a solution.



Now we all know that not everything dissolves in water. So, why some and not others? It's down to the structure again. The compounds that dissolve in water are called lonic compounds. They have the electrically charged element available to easily join up and move in the water.

Not all ionic substances dissolve in water freely, but let's just focus on the structure to simplify the concept.

This explains why grease and oils do not mix with water or dissolve in water. They do not have this charged polarity or structure and so there is no attraction between the water molecules and the oil molecules etc.

#### So to summarise

Dirty water is just holding particles that we see as discolouration and you can filter these out. Clean tap water appears colourless but has a lot of ionic compounds (minerals) dissolved into it, which have become part of the whole new structure.

#### The Concept of "Pure" Water Simplified

In order to really appreciate what this topic is about, we must use the correct terminology. So the following pages will define, clarify and even give you definitive numerical values for water purifying and levels of purity. Whilst some of this may seem overkill for the pure water cleaning contractor, I want to give you the ammunition to cut down the B.S that you will no doubt be told by all sorts of people.

#### Units of "Purity"

The first terms you need to know are the units that the purity is measured in. The most commonly referred to is ppm. This stands for "Parts per Million". What is agreed is that 1mg (one thousandth of a gram) when added to 1 litre of water and it dissolves (remember what type of compound this needs to be) it produces a solution of 1ppm of mineral i.e.

1 milligram of salt dissolved in 1 litre of water = 1ppm salt (Nacl)

This is suggesting that there is one million times more water than the salt added. There is only one part of a million units of water that is the salt.

Let's appreciate the physicality of 1ppm of salt. Think about an IBC tank. This is the big white caged plastic tank in a cube shape that you see on lorries or sitting in yards. These tanks hold

1000 litres of liquid. So to achieve 1ppm solution, we would need to add 1 gram of salt i.e. the size of a small sugar lump to 1 full IBC tank of water. When it is fully dissolved, we have 1ppm water solution of salt. It's not a lot is it? This is an important image to consider because the whole point of pure water window cleaning is that the glass is left free of any mineral spots or streaks. So you will need to question – what is pure enough before spots are seen? This is a common argument I hear and ultimately a subjective point.

To keep this in perspective, the ppm of minerals in the water we get delivered to our houses varies from as low as 25ppm (Scotland) to 700ppm (South Coast). This occurrence is due to the ground composition that the rain water falls on or is collected in.

This brings us to the next term - TDS - meaning Total Dissolved Solids in the water.

This is how some testing instruments deliver a ppm reading.

Notice this describes "dissolved" solids so we are talking about a solution. You will see later how important TDS readings are for you when choosing the right equipment and approach to your cleaning.

Another related term is ppb – or parts per billion. This is just a fraction of a ppm.

So as soon as the TDS reading on your tester shows less than 1ppm, you are dealing with ppb.

So just a fraction below 1ppm may be shown as:

999ppb = 0.999ppm. We are now dealing in ppb. Every handheld TDS meter will show "000ppm" (scale 1 – 999ppm) when testing deionised water that has just been produced using a column of mixed bed resins. This means that the water produced is containing less than 1ppm, so it will in actual fact be water that can be described as ppb water. We just don't know if it's 1ppb or 900 ppb. Keep this in mind when claims of a special new technique say that purification has been taken to new realms. It's all a matter of what units of measurement you use to describe an effect.

Probably the most useful term and unit used is conductivity. This is the measure of how easily an electrical current passes through a solution. The units are science/meter or more appropriately to our scope of science here micro-siemens  $\mu$ s/cm<sup>-1</sup>.

It is in actual fact conductivity that is measured by all the electronic meters that we use to measure water purity. The meter then converts the reading to TDS (ppm) so we can use the data to compare values.

The micro-siemen ( $\mu$ s/cm) is related to the ppm range as follows:

1ppm (TDS) = approx 2 µs/cm

But only at these very low levels can you approximately double the TDS value at higher levels it is almost 1:1 ratio.

So let's go as low as we can so you can see where the purity range realistically starts. If you measure the conductivity of just water with only the water molecules contributing to this reading you get 0.005  $\mu$ s/cm at 25°C. That is 55 thousandths of 1  $\mu$ s/cm. This also equates to another term used, particularly in the USA, of 18 megohm (m $\Omega$ /cm). "18 meg" is accepted as the best we are going to get.

But this "special" water does need special attention. As soon as it is exposed to air, the conductivity increases tenfold due to the  $CO_2$  extracted from the atmosphere. It even needs to be stored in special vessels, as plastic or glass will leak in contaminants.

## What are the industry standards?

Thankfully, some people have got together and set some reference standards with different grades to guide us. There are 4 recognised bodies.

- ISO 3696 (1987)
- ASTM (D1193-91)
- NCCLS (1988)
- Pharmacopeia

We will use the first 2 to simplify things. The ISO body we all recognise in the UK as they apply standards to everything and the ATSM is the American society.

		ISO 3696 (1987)		ASTM (D1193-91)				
Contaminant	Parameter	Grade 1	Grade 2	Grade 3	Type I*	Type II**	Type III***	Type IV
lons	Conductivity at 25 ℃ [µS·cm <sup>-1</sup> ]	0.1	1.0	5.0	0.056	0.1	0.25	5.0

Fig. 6

The Water Fed Pole industry does not talk in terms of ASTM type 2 or 4, this is the realm of the chemists. Just calling water pure, as you can now see is wholly inaccurate and could mean many things. You need to focus on the conductivity or ppm of the water in question so you can at least compare to the table above. However, all that said, what do you need to clean effectively? Any of the above will do a good job, but it's up to you if you now want to meet a recognised standard.

#### One final point on terms

We might call it deionised, demineralised, distilled, RO or filtered water. Get it right that it is all the same with the same qualities. Those names just describe what we did to achieve the purity it possesses. It is the conductivity or ppm that matters. The lower these values are, the more capacity the water has to dissolve and hold in solution.

### How the Pure Water Machines work

All the "machines" or pure water generators that you will come across, have to follow the basic processes of water purification adopted for this industry. They will vary tremendously in basic structural design, quality of build and aesthetics, but they are all going about the purification process in the same way.

Let's start with the simplest approach. This involves passing the raw mains tap water through an upflow mixed bed resin column. This is a strengthened plastic or grp cylinder that normally stands upright and is filled with an ion-exchange resin that removes all "charged" (ionic) substances from the water creating a very pure water product. The product water will often be holding less than 1ppm of the ionic minerals (mainly calcium) and will always provide excellent cleaning spot free results.

This is often referred to as a DI system or Demin (Demineralisation) system. It relies on the stored resin alone to purify the water and is mainly used in areas of low mineral content water.

It is worth understanding a little about this process as it is present in all of these industry machines to some degree or another. It is called ion-exchange resin. This is because it works on the basis of extracting the charged ions (or charged particles of ionic minerals) and holding them on the surface of tiny synthetic beads. Now, removing those particles would cause an imbalance of charge so the beads give up their own charged particles to replace the mineral ones. You would expect the same outcome of contamination if one is swapped for another wouldn't you? But what is given back to the water is itself, just one part of water.

E.g.

$$H_2O = 2 x (H) + 1 x O (Oxygen)$$

But when water separates it doesn't do it like this, but like this:

$$\begin{array}{rrr} H_2O \rightarrow & H^+ + OH^- \\ \leftarrow & \end{array}$$

The resin is called "mixed bed resin" because it has beads that are charged with  $H^+$  and beads with  $OH^-$  particles. These are exchanged for the charged mineral particles i.e.  $Ca^{2+}$  and  $CO^{2-}_{3}$  (Calcium and Carbonate). When the  $H^+$  and  $OH^-$  find each other, they form water and this just adds to the rest passing through.

This means that the beads gradually attract more and more minerals whilst giving up the charged water particles. But they can only hold so much and when full of minerals, the resin beads are exhausted. The resin now must be replaced and the process continues.

In the water treatment industry, this mixed resin is used in a separated state. This allows it to be regenerated using chemicals but for our industry, this approach is not advisable. So the basic DI system is attractive in its simplicity, but it does have its pros and cons as you will see later.

You may see a vessel attached to a tank, that stores the water (pure or raw), or the vessel can be alone on a trolley or even carried around. Raw water in – pure water out. It is instantaneous.

The other type of "machine" is referred to as an RO system. This is short for Reverse Osmosis. It is the most common system and has a few extra stages of water purification included in its process.

The water product is the same as the DI, so there is no purity benefit, it is just more economical in its use of the resin, so, it is a lower running cost approach.

As we go through the stages of this process, I want you to think about what you learnt previously in this chapter about the physical structure of the water molecule. Use it to picture and animate the events – it helps tremendously.

#### Stage A

The input water which is normally mains drinking water is passed into and through a physical filtering barrier. **The sediment/particulate cartridge.** This is just a polypropylene tube, but it is capable of removing any "**insoluble**" **particles** of **5 microns** or above. This is 5 thousandths of a millimetre. It basically removes visible dirt and sediment. This is necessary because further down the process line, there is a super filter so fine that the dirt level present in our drinking water would block and clog it in hours of use. So this stage (A) could be considered membrane protection.

Once the water has left the filter cartridge, it is not chemically charged in any way. It has just had the dirt removed. It does still have chlorine and a very low level of dissolved organic chemicals present. The chlorine is very harmful to most reverse osmosis filters and must be removed. So a second filtering stage is used to remove the chlorine, by passing the water through an activated carbon charcoal media via a cartridge. It is the same size, shape and appearance as the first sediment cartridge and usually is found situated right next to the first sediment cartridge as well.

As with all filters, they get blocked or exhausted and will eventually start to inhibit the flow or passage of water through the cartridge. So they need to be changed regularly (between 1 - 6 months for tap water fed systems). They are low cost items and frequent changing will always benefit the process.

Once through the 2 filters, the water is now largely particulate free and chlorine free. But is still has the same TDS (ppm). All the minerals are still present and they will give exactly the same spotting and streaking that raw water would give when used to clean windows.

#### Stage B

The next stage is the RO or Reverse Osmosis process. This basically is a very, very fine filter **membrane**. It is referred to as an "RO membrane" or sometimes "RO filter". Let's look at just how fine this filter is. Remember the 5  $\mu$ m (5 micron) sediment filter which has "pores" in the filter of 5 thousandths of a millimetre? Well the RO membrane has "pores" that are 1 Ten thousandths of 1 micron in size. This is so small that the single "atoms" of the minerals dissolved in the water cannot pass through. BUT, and this is a very big but, the pores are large enough for the much smaller water molecules to pass through. The water can now be removed from the minerals, but there is a very important factor involved which we need to appreciate. Energy.

We need energy to push the tiny water molecules through the tiny pores of the membranes and to do this we use "pressure". The water will not just "fall" through the pores, it really does need a good push. So, water pressure becomes a fundamental factor in any RO system and one which you will have to consider many times when owning a pure water window cleaning system that is based on RO.

Basically, remember the greater the pressure, the greater the amount (flow rate) of pure water produced and also the purer the water is as well.

#### **Reverse Osmosis**

So a little on the term reverse osmosis. Osmosis is the effect seen when 2 water solutions are separated by a special "membrane", an RO fine membrane. The pure water from the more dilute solution migrates through the membrane across to the more concentrated solution. Its an effect we see in nature and it plays a large role in the processes of life. But we are talking about REVERSE Osmosis. It is the opposite of the above. Water is removed through a membrane **from** a concentrated solution (tap water with minerals) to a purer (more dilute) solution. But because we are going against nature, we must add energy or pressure. That's Reverse Osmosis.

Back to our machine process. We are through 2 filters and now we need to push the water alone through the membrane, for which we need pressure. The tap pressure in our homes is often enough to create an acceptable amount of pure water (approx 50psi needed) from the membranes we use. If however you boosted this pressure, using a pump set for example, the production can be dramatically increased i.e. 100psi can often produce 2 - 3 times the value of 50psi.

Larger RO systems always possesses a booster pump to create and control this delivery pressure. If your demand for water is large, you will need to use this boosted process. More about this later.



From the picture, you can see how the minerals would start to collect on the LHS and increase in quantity very quickly as the pure water escapes them. If they are left to do this, they eventually reach such a concentration that they form an insoluble solid (scale) on the surface of the membrane and block it permanently. So we want to pass these to a drain and lose them forever. This is where the waste or drain function enters the process. With RO as you produce pure water you are constantly passing water to drain that holds the mineral salts. The TDS of this water is as much as 160% of the raw input water. The quantity of the drain water is an important issue. Firstly, water is being "wasted". Economically and ecologically, this has concerns. The drain water does not need to be wasted. It can be used for any other purpose that tap water is used for, even drinking (although sterilisation may be needed). A percentage can be returned to the raw feed but minerals will always need to be removed totally from the process to prevent blockages.

You will normally have 30 – 40% product water with the rest going to drain when you rely on the "tap" pressures available to us in the UK. When the input water is boosted in pressure the product ratio can be as high as 70%/30% - pure/waste. This is why static systems are a lot more economical than the van based ones. The purity of the RO product water is a big issue which will frequently raise questions while you use an RO cleaning system. It is not as pure as the DI (resin) product water. It is produced by a different process with several variables. The purity will vary, but a general rule of thumb when conditions are "normal" is that the reduction of minerals and other dissolved chemicals is 95-98%. So this translates to:

Raw input water (London) = 450ppm RO product water = 9 – 23ppm Raw input water (Scotland) = 50ppm RO product water = 1 – 3ppm

So the RO water in London would still not clean streak free, but Scottish water may very well produce spotless results. More about this later.

Now the purification process is not yet finished. This RO water is then passed through the very same DI resin columns as used in the DI systems. But unlike the single stage DI

process, at least 95% of the minerals have been extracted and passed to drain so the resin only has to deal with a maximum 5% of the raw water TDS. This is the whole point of the RO system. It makes the resin last 20 times (minimum) longer than if we were to use a DI system. It is the resin that is by far the most expensive consumable involved in this whole industry.

The water is now ready to use and is at varying degrees below 1ppm. The machines pump this water up the poles to wash the glass. Now you need to consider the facts about this cleaning technique before you invest.

## **Chapter Four**

#### The facts and considerations you need to be aware of before you invest in this concept.

Whether you are a traditional window cleaner converting to Water Fed Pole or a beginner to the industry, the following points need some thought and will contribute to either your success, failure or general experiences in this industry. However, a lot of what follows is already a reality for the traditional cleaner and I ask him to just be aware if nothing else that he needs to up his game a little when converting over to Water Fed Poles.

#### **Competition**

Don't be under the illusion that you won't have any competitors cleaning this way. It's no longer expensive to purchase the bare minimum essentials and have a dabble at cleaning windows with poles. You may be one of the first to introduce Water Fed Poles to an area or marketplace, but you probably won't be the last. If you have a lucrative niche then have a plan for when someone else approaches it or when the customer himself invests to bring in-house as is very common today, particularly in schools, colleges, nursing homes, hospitals etc.

Protect your business with simple contracts for services and terms. It is so worth the extra effort to do this, as it gives you the ability to budget, plan and invest. But most importantly, to me at least, is it adds intrinsic value to the business which can be realised when selling.

No one wants to buy an uncertain future income, at least not for any proper money. By just doing this alone you are already competing with an advantage from day 1 over a sizeable percentage of your competitors.

One final note on competitors and one quite close to my own heart. You may very well create your own main competitors. Yes, you guessed it, your employees. Every single one of them (unless they are family – generally) will be capable of setting up in business against you. Don't think "yes but they won't touch my customers" because that's the first thing they will do. This industry has a massive tendency to do this way above and beyond most other industries.

Here are some tips that work massively to reduce the occurrence (not 100%) but most importantly handicap them when they do. Just them knowing you do these things will deter **most** from day one.

- Create a brand (name or persona) for yourself, including logo, uniforms, paperwork etc
- Try to employ them on a self employed basis and pay by piece work i.e. certain value per individual jobs
- They <u>must</u> sign a contract with strong anti-competition clauses, especially mention certain customers by name
- Never let them know what you charge. Never mention money to them. Sometimes, it is unavoidable, but keep it to a minimum
- Never let the same guy do the sales work and the cleaning work or if you see these two becoming close, pay attention to what's going on. It's a major requirement for any rogue employees to have the price knowledge and the actual cleaning knowledge. But the main thing is the customer relationship. If they have all 3, the risk becomes significant.
- Secure your data. This is your customer list and all the details of what has been said, done and is agreed to be done in the future. Get an electronic database and limit access. This will become your company's most valuable asset and they will want to take it. Why? Because they can get away with it every time. There is no penalty if you catch them, they just deny and then use it to build their own business at your expense.
- Fit trackers to your vans. Keep it to yourself.

You may think this is all a little extreme and cynical, but I have had this personally happen to me twice and I wish someone had told me this a long time ago. To be honest, even if they had, I probably wouldn't have done most of it. Sometimes it takes a whole load of pain before we act. Don't be as lazy as I was, there's just too much at stake!

## The Labour of it all!

Window cleaning traditional or otherwise has always been a relatively strenuous endeavour. Using a WFP can be even harder work if you are working to the extremes of reach and contracted on the larger jobs available. Residential work only utilises the smaller poles but still has an intensive and often frantic pace. The weights and manageability of poles today is the best it has ever been but it won't improve anymore at those past leaps and bounds. You must be aware that it is hard work for you or your staff. If you are to be the only labourer in the business, then check your health. Your overall fitness is essential. Any "old" injuries must be sorted as they will be challenged and reoccur just when you least need it. It is probably best to be predominantly residential but there are many solo cleaners that do the commercial sites as well.

Now, should you hire in cleaners, firstly refer to my section on competition, then go for the fitness and best suited to your clientele. Expect an above average level of absenteeism and unreliability until you get the "right" guys. They will all be working hard and you need to protect them with insurances and good work practises and equipment. Whilst this all seems a huge hassle, this is the only way to grow a business and generate greater income above and beyond the one man band results. Finally, on the hands-on aspects, consider the <u>weather.</u> You can clean windows in the rain with WFP's and the snow and ice! It's miserable if you ask me but only sub zero temperatures or heavy snow, really start to hamper your progress. This means the winter can be a lower income period unless you are working to contracted arrangements. In recent years, the intense cold spells effected all the cleaners for many weeks, regardless of contracts or not.

## **ROI – Return On Investment**

You will need to know what your investment in this enterprise will return you. It is a very front ended expenditure, so you should look at it as a cost spread over the natural life of the equipment. Let's consider some basic figures:

Average cost of medium sized system at today's prices=  $\pounds4,000$ Van cost =  $\pounds8,000$  (utilising existing great benefit)  $\pounds12,000$ Average life of equipment = 4 years Therefore -  $\pounds3,000$  per annum Maintenance and repairs =  $\pounds500$  pa

Total = £3,500 pa

Now consider with consistent effort to market your services, you achieve 5 days per week on site. At today's prices for residential work, the average income per day is £230 and commercial £350 (1 man in van) average per week between the 2 types is £250/d giving. £1450 per week approximately £6,000 per calendar month income.

How you model your business will determine how you spend on company expenses and what profitability you generate. So from your initial investment or financed investment (300pcm) the gross profit can be seen to be significant.

Now there are a lot of assumptions made above and most contractors will be either above or below this income, so use it only as guidance.

A tidy way of forecasting costs and managing cash flow is to finance the equipment and van. The income from jobs, pay for the monthly finance as you grow the business. But this is not the most common path in today's economic climate, as finance is not as available and having the debt paid and done with is often more comforting.

This type of cleaning does allow the more ambitious company owner to "unitise" his resources and forecast quite accurately.

l.e. 2 men + van + van mounted machine gives a cost of  $\pounds$ 2,800 per calendar month ( $\pounds$ 2,500 wages,  $\pounds$ 300 finance) plus fuel

Income =  $\pounds$ 6,000pcm

Profit generated = approximately £2,500pcm.

I can't stress enough the importance of creating an accurate business model on paper so you consider most of the recurring costs that will always be there to chew into the profit, so do the homework!

## **Chapter Five**

# The Economics to be aware of when planning your investment (Costs, Job pricings, Profits)

The previous chapter is useful in describing the way to think about what you're actually going to get out of your business or investment in financial terms. Let's look in a little more detail at the costs, income, pricing and business modelling available. The following figures are not to be taken literally as they do change for various factors, but they are the real values I personally experienced when I ran and owned my own window cleaning companies. Of course, you need to constantly and creatively be reducing these costs or even better, eliminating them altogether while maximising profits.

Firstly, you need to decide on the basics of your business structure. Are you going to be a proprietor or a limited company? It's a personal choice, but generally a LTD company is formed when you create a company that you intend to grow with employees and potentially challenging liabilities.

The proprietorships tend to give you more flexibility with less external interface than a LTD company, but the main difference of course is the liability you have with either of these set ups. Most go for Ltd Company's because of the peace of mind you get knowing if the business doesn't work you can walk away without any personal debt imposed on you from creditors, law suits, employees and a whole load of other issues. The proprietorship has some protection but nothing like the Ltd Company. My advice is if you're a one man band and don't want to grow at all from this position, go sole trader (proprietor). If anything else, go Ltd. Most small businesses have some of the same basic costs. This industry is quite typical. Here is a list (not exhaustive) of some foundational costs to consider - remember to always create a creatively avoid, or remove as many as possible:

		Pcm	Initial
1	Banking costs – charges mainly	25	
2	Computer and associated toys		500
3	Company literature – branding	50	1000-1500
4	Uniforms, daily paperwork	5	150
5	Website	20	500
6	Communications – Telephone, mobiles, OMB 2 teams	50	500
7	Marketing (basic minimum)	200	300
8	Van (if required)	220	
9	Fuel (1000 miles)	200	
10	Insurance (Van, Business) OMB	100	
11	Equipment (Van mounted machine + poles)		4000
12	Water usage when working regularly	60	
13	Water Fed Pole Consumables and maintenance	50	
	Larger Company	1180	6950
	OMB	980	6450

So it is clear that the slightly larger enterprise will have higher costs and I have only increased the telephones to accommodate this so largely the figures are for the OMB. There are no wages or earnings shown. You are looking straight away at £1,000pcm recurring costs once you start cleaning.

You may whittle away at some of these costs but to provide anything that is half professional and trustworthy, you are going to need the majority of those points and more of your own additions as you exercise your personal preferences and beliefs.

You may opt to finance the Water Fed Pole equipment to help with initial cash flow, but this will add approximately £150pcm costs. Presently, finance is difficult to get for this type of

equipment. You must be a home owner and have a very clean credit rating. Approximately, less than 5% are purchasing this way. Most buy outright and often put on credit cards which they can manage as they see fit.

Another big assumption I'm making in the above list is that the OMB is working from home and does not need premises. A lot of owner operators do work from home, but not all. As soon as you are running more than a one van team, the premises option becomes more and more of a probability. This of course adds a serious monthly cost to your operation, say  $\pounds1,000$  pcm including taxes, utilities etc.

So let's summarise:

One Man Band with 1 van working from home using existing van + buying	£800pcm
equipment	
One Man Band with 1 van working from home + financing van + equipment	£1150pcm
One Man Band with 1 van + premises + financed van + equipment	£2150pcm
2 van team – Premises + financed van + equipment (no wages included)	£2520pcm

This now makes the income required a real number. The profit is how you pay yourself and the staff that do the work.

From the earlier chapter, we estimated a good performance from a OMB could produce  $\pounds$ 6,000pcm. If we reduce this down for holidays, sickness and other eventualities and use  $\pounds$ 5,000pcm, then the profitability can be seen.

The One Man Band, depending on his monthly overheads, is making between  $\pounds4,200$  and  $\pounds2,850$  gross profit. Giving enough thought at these early stages makes a whole load of sense to your income. No option is right or wrong, but pick the one that best suits you achieving your goals.

It can be seen from these figures that once the business fundamentals are paid for, the profit can be ratcheted up in a larger business. Consider each van mounted system and 2 operators as income generating units. If each brings in £5,000 average pcm after wages of operators and van and cleaning costs, this unit would contribute at least £2,000pcm <u>net</u> profit to your business. Interestingly, it has been found that placing one operator per van system generates even more profit, even when considering that less work is done (but it's always more than half of the 2 van team).

The way you receive your income can vary as well. More will be said about this later, but briefly, you can collect small amounts from hundreds of people as in residential cleaning or large amounts from fewer as in residential cleaning. The risks are different, the cash flow nature is different and so is the flexibility. I personally used to factor or invoice finance my commercial cleaning business so I got the cash straight away. It does come at a cost though. But ultimately, I found the more established regular business services via contracts and agreements, the better everything was for the company, including its equity value when I finally sold it.

Pricing jobs is a popular topic I get asked about regularly. How do you price a job? There is a lot of considerations and factors before you adopt a specific formulae. It's easy to work out what your costs are, as we just did, and add some for your profit, but we have to deal with the irritation of competitors as well! You will need to adjust the following to meet your particular needs and circumstances as we all have slightly, if not great, differences in our philosophies.

 How do you want to position your company in the marketplace? i.e. Top quality service and results but the higher end prices OR amongst the lowest prices "get what you pay for" end of the scale. You have to make an agreement with yourself on who you are going to be here and then act accordingly. Why? Well because it's a very competitive industry and the customer has a lot of choices, so you need to know where you stand in their eyes. Just be aware there will always be someone who will come along cheaper than you. Guaranteed. If you sell on price you will not get any real loyalty and they will drop you for the next cheaper guy. And why not? You made it clear that you do the same thing just cheaper when you won the job. Remember, if you live by the price, you will die by the price.

Conversely, if you choose the top end you had damn well offer the highest level of services and value when charging top dollar. You will be rewarded well in this position and I feel this is where I personally would position my business. That said, thousands of cleaners make a good living at the lowest dog eat dog pricing. This is usually possible when the forces of supply and demand are at work. In some areas, a cleaner will have little or no competition and regardless of the quality of service, they maintain the income by virtue of "no other choice". But this is never permanent.

What results do you want from your business? You may be just wanting to earn a
wage at the end of each month with nothing left over. You may want a specific value
to draw and whatever is left goes towards the next drawings. It may be important for
your business to create and retain wealth over and above wages to provide capital for
growth and investment.

Put figures down on your business plan, considering the above and decide what you want to achieve. Without this step, you will just wonder from month to month, making do with what just happened, good month, bad month, good month.

- What is your capacity? If you estimate a half hour to clean a residential property, then even with a limitless supply of customers, you are only going to do approximately 15 homes. These 15 jobs need to give you the daily income you calculated i.e. £5,000pcm, from 22 working days take 2 away for holidays 20 days. This equates to £250 per day. So approximately, you need to be charging £16 per job. This is just simple arithmetic and I'm not suggesting this is how to arrive solely at a sales price, but it is surprising how many people don't even do this exercise. If nothing else it gives some guidance to the ball park income you need to create. Is this a minimum Are you in trouble if this isn't achieved? You may trial this price per home and see if your business model is viable. Do all your target market expect £8.00 per clean? The results of a bit of maths together with a little market research may convince you that you need to change your market positioning to get these higher required values or you may even need to travel further afield to areas of greater affluence.
- Residential or commercial or both? We have touched on this choice earlier and this will massively direct your pricing strategy. The residential market is simpler as houses are usually grouped in similar sizes, but the commercial arena has a vast array of shapes and sizes from easy to impossible to clean. As a One Man Band, the commercial market will sometimes demand too much. Often, health and safety requirements will insist on more than one operative and may stipulate some specific qualifications, but this does not mean you can't pick and choose just what suits you. You often find that the OMB is well positioned to offer very competitive rates (still very profitable) against the larger company, for certain types of buildings. For example, a public house or small nursing home or hotel will generally prefer the local OMB, knowing they can get a lot of value from a keen, tightly ran outfit. Spend time looking around your targeted area and classify what kind of properties you have to approach and then plan on your mix of client types.

Before considering the clients price preferences and the competitors pricing philosophy and what you think you "can get away with", you should address the 4 points above and you would then have the foundation of some sound business principle for this industry to guide you. A lot of cleaners will have a price strategy of finding the going rate and trying to compete by price, but finding they have to squeeze their costs so much that the service quality is seriously compromised. Without even considering "market positioning" as you have they are relegated to the lower tiers whether they like it or not.

I advise starting with the prices you have theoretically calculated; at least you are starting with profit in mind. Next, look at the clients. What are the presently paying and most importantly of all, what are they **NOT** getting from the services they pay for. Where is their pain, frustration and unfulfilled needs caused by the existing contractors? Time spent on finding this out is the best investment in your business you can make. Once you have identified these things and worked out how your services address these issues, you are positioned to compete at a price that sustains your business and offers greater value than they presently receive. Clients who have not had a cleaning service will become loyal customers when they see how you work and what extra value you offer.

To start the quoting process, you need to assess the amount of time the job will take. How many of the jobs you can get into your day is key to providing the right prices. I have heard many guys say a price per window, but this is not only lazy, but can get you into major difficulty. The access and height and reach will all consume time and effort. The travel to site, the set up and set down work all needs to be taken into consideration. No one will be able to tell you from a book or report how long a 50 bed hotel will take to clean, you need to survey and estimate this individually. Estimating is a skill which you will learn and if done well, will serve to make you money all the time you work in this industry. So work to develop this skill. Even sacrificing some initial jobs to get the experience is well worth it.

Once you have the time and effort calculated and you have your "business rate" you can then look at the client type and use your judgement as to what value you think they perceive your work at.

This is not easy to get right every time and is often the stage of which the job is lost. It's a very intuitive decision and for many, the best way to approach this is to not inflate your price whether you're quoting ICI or the local school. If your costs are known and your profits correct for your business, then you at least know that if you lose the job on cost, then it wasn't right for your business – let someone else struggle.

When it came to commercial work, I generally worked on  $\frac{1}{2}$  day or full day jobs. I knew my full day price for that work unit but when I was pricing half day jobs, it wouldn't be just half the day rate. Usually it was 65 - 70%. Often, you wouldn't get 2 half day jobs done in a day due to travel and set up times and even daylight hours had their impact. The jobs that were a few hours work were considered  $\frac{1}{2}$  day prices and the ones that were just over a  $\frac{1}{2}$  day were priced on full day. This worked well and gave good conversion rates, but obviously you can bend these rules when circumstances like location arise that make it very cost effective for you to take on several sites and quote aggressively.

## **Chapter Six**

#### <u>Overview of the equipment requirements and what you need to know when</u> <u>choosing what to invest in exactly</u>

This chapter is going to guide you to choosing the most suitable equipment for your business and work. I will start with the low frequency/volume cleaning set up and journey through to the hired multiple van organisations. Your requirements will fall somewhere in this range in one combination or another.



## The Bare Necessities

In a lot of regions around the country where the tap water is soft (low mineral content < 80ppm), the locals can get a reasonable clean from simply feeding tap water at the supplied pressure up a water fed pole, out through a brush and cleaning that way. All that is needed is a suitable length pole and a hose trolley (B&Q basic) to reach from the outside tap to the windows in question. The few spots left on the glass are still such an improvement from the filthy frames and glass present before the clean. This for many is a real result. A 21ft telescopic pole made from either aluminium or glass fibre is perfect for the infrequent cleaner. This can be the DIY home cleaner or small shop front owner. The 21ft length will give you access to the 1<sup>st</sup> floor and often above windows as well as signs, soffits and general frontages. A basic

garden centre hose reel with 30m of hose will suffice and the owner now has a safe, effective cost saving system that will last many years. Just make sure you purchase a hoselock compatible fitting on the pole and it comes complete and ready to use.

#### Add a professional twist

To take the next step towards a flawless finish, you can now add pure water. If confined to the glass, even the basic one pole DIY'er can produce the most pristine finish on his windows. Replace the raw tap water with a source of deionised water and the spots and streaks you get from the tap water clean are removed completely. A top notch professional will not produce a better finish. It's all in the water and given a little technique with a suitable WFP the results are excellent.

The simplest way to obtain or produce deionised water is to use a basic DI cartridge. These are called residential or DIY kits and comprise of a pole (20ft) and a cylindrical tube cartridge filled with demin resin. You can buy the cartridge on its own and get quality pure water suitable for cleaning as long as the resin lasts. Hard water areas will consume the cartridge quickly and you may only get several cleans from it, but if you carry out a raw water pre-wash, the cartridges can provide an economical glass cleaning alternative. So you can clean in this style for a very small investment indeed.



Fig. 8

## The Residential One Man Band

If you wish to use WFP's and pure water but only want to clean residential premises with the minimum outlay possible, the option usually taken is as follows. To produce the water a basic drinking water RO under the sink unit that has been modified with a small DI cartridge so it delivers around 6 - 12 litres per hour of usable water. The water is collected in a small tank or water butt (garden type) overnight and throughout the day. 25 litre drums are filled from this tank and they are loaded in the estate or small van with a trolley pumping system and 1 - 3 telescopic poles of a suitable length for domestic houses.

#### Let's look at this set up in a little more detail.

## Pure Water Generator





You can purchase drinking water systems from many outlets online. These come in different forms, but you want the largest Reverse Osmosis system you can buy in its class if possible. I say largest, by this I mean the one with the highest product rates of water. They are classed by the GPD (gallons per day – US gallons) of their membrane and range from 50GPD – 300GPD. These are solely powered by the pressure of your incoming mains water supply and they don't actually produce the values quoted. 50% is good, often even less than that is delivered. There are pumped versions that perform better but need an electrical supply. It is worth considering paying the little extra for this.

Some of these systems have been modified and marketed directly for the DIY WFP cleaner, but they are just the same as the rest except made easy for you to just plug and play. They have 2 - 3 pre-filter cartridges that will need changing at

least every 6 months, often more frequently. This will cost around  $\pounds 20 - \pounds 30$  a time. The resin cartridge will need refilling every 1 – 3 months. TDS meter (water purity tester) will guide you here.

There are also RO membranes involved (1 - 3). These will last 1 - 2 years and cost around £60 each when replaced.

This is a DIY fitting situation. If you're a little handy it will take a couple of hours, but otherwise a plumber would do this for you.

## The Portable Trolley

Once you have the water on site, the work begins. You are going to need to get the pure water to the glass, so we need a portable pumping rig that will hold a reasonable amount of water and easily allows you to manoeuvre this underneath any window on any property. The trolley will have its own power supply and pump and the operator will use the WFP to wash the windows and frames.

There are various trolley systems of this type on the market. The values they hold range from 25L - 50L and even 125L. This is where the weight comes from and the safety concerns begin. 50 litres will last around 45 minutes and is manageable to lift when necessary. 125 litres is great if you're a distance from your vehicle, but impossible to lift. 25 litres is light but

needs the most frequent filling. Each will have a power source i.e. battery. You need a battery that can last the day and with a nights charge, be ready the next day.

I have found that you usually need around 35 amp/hrs to achieve this. So beware of the dry cell small batteries which will be good for only about an hour or so, but most do use the larger "golf" type batteries.



The trolleys have a pump which is much the same as the pumps used on the larger machines. These 12Vdc diaphragm pumps are reliable and effective. They are capable of pumping water up the largest pole so there is no limit on your capacity with a good trolley system.

Finally, the limited water supply needs a control system to ensure the pumps deliver just the right amount of water, which varies continuously. The variable speed digital controllers are the best choice but some trolleys get by with a simple on/off toggle switch and a water throttle back.

Do be aware that these are only access transporting systems for water. They **DO NOT** purify the water; this has to be done with filtration. Keep the two separate as it is a lot more efficient. As with most things, the quality built items will carry a higher cost, but do be aware of the DIY type systems. Whilst cheaper, they won't be as reliable or durable.

## Entry level Van Mounted Systems

The volume of water you decide to work with is a major factor in this industry. Because a WFP will on average use  $1 - 1 \frac{1}{2}$  litres per minute when on the glass, the amount of time you



have to clean will eventually come down to the amount of water you have on site. A lot of cleaners don't want to clean for 8 hours per day. They are usually on their own and do a lot of squeegee and WFP work so they see this as an additional tool to overcome the safety issues and often to speed up work too. But whether or not this is the case, the smaller van mounted systems are a common choice.

Firstly, consider the procedure: The small tanked system is bolted to the floor of your van. It is semi-permanent – so don't think it's easy to take out on a weekend. This system will actually do the purifying and is equip with the filtration to

generate the pure water which it stores in the tank. Whether the system is a DI (just resin) or

an RO (Reverse Osmosis), this is still the case. A DI is used in areas of low TDS water and will only take less than 1 hour to fill, but the RO, used in higher TDS areas is an overnight filling system. Either way, at the start of your day you will have a tank full of pure water ready to drive to the site. The system will pump the water up the WFP's from the stationary (road side) van via hose trolleys (50 – 100m). When the water is finished, the work stops. If filling on site is allowed, only really the DI will fill quickly enough to maintain the cleaning. This is the same principle for the larger tanked systems as well.



The entry level system is a small tanked system, usually 250 – 350 litres. It shouldn't completely

consume the van capacity. Go for a small footprint tank allowing you floor space for other equipment etc.

This will generally mean that you only need a small van such as a berlingo or partners etc. The payloads of these vans are adequate, but you still need to be mindful of your legal obligations when it comes to the highway codes. Correctly fitted, the system will be just behind the bulkhead for good weight distribution. The smaller van allows a lower initial investment, as with the machine.

This is a common setup for the more serious residential cleaner. He can address commercial work as well but only within the restraints of the water volumes. The basic 250L tanked systems will keep a guy working 4 - 6 hours, which between access down time and physical breaks, can often be enough to last a day with some operators. Many stay with this set up for years and only upgrade to larger if the business growth dictates, particularly as they do a larger proportion of commercial work.

As mentioned earlier, there are some different features with this from the OMB with trolley set up. Firstly, the van has to be on the road normally, and this can often be a distance from where you need to work. This raises 2 issues.

- Security of kit
  - Transport of water

If you opt for an external manifold that is fitted to the side of the panels or under the bumper,



the system can be filled with water and deliver water with all the van doors secure. The system will start and stop automatically, so no need to revisit the van constantly.

However, to get the water from the van to the WFP, we need a decent hose trolley. There are 50m - 100m hose reels allowing you to work at these distances from the van – they connect to the manifolds and then straight into the WFP.

The Water Fed Pole's are chosen with the jobs in mind. The entry level operators will normally us the lower level pole, especially for residential work. The poles are common place and at the more affordable end of the scale. If it is known that a particular building, normally commercial, has the need of a longer pole i.e. 3 - 5 storeys high, then you have no option but to purchase the larger carbon poles. The van system will work just as well with these sizes and a good clean is achieved with a little mastery of the larger pole handling. We will talk more about poles later in great detail.

#### **The DIY Commercial Customer**

It may be a sign of the times, but more and more establishments that previously had contractors cleaning their buildings, are opting to do it themselves. They generally have the labour to use once a month and just need the suitable equipment and some knowhow.

This setup comes in two ways, depending on the size of the property and resources available. The first is the "make it as you go" arrangement. This consists of a portable pure water generator, hose reels and a compliment of poles – small and large.

This suits the schools and colleges and larger nursing homes and residential care homes. The equipment is relatively small and compact and can be neatly stored away without too much inconvenience. The trolley has all the filtration necessary to create the pure water. It just needs a tap feed and with its own battery power or mains electrical power will continuously produce pure water on demand as long as needed. It is based on RO and DI and has the same limitations as the production associated with van mounted but it does give enough continuous flow of water to adequately feed a pole without the need of storing the water to be boosted at a later time.

The trolley will be parked close to a water supply and the product water is hosed all the way to the vicinity of the cleaner with the pole. Any size pole can be used with these systems and often the larger carbons are opted for due to the height of the buildings.

There is another approach which will work for the previous clients but is usually used on larger, more spread out properties where access can prove challenging such as shopping centres or universities. The main issue is the distances between points of cleaning. A small van would address this generally, but the expense is unnecessary. We opt for a central site that houses a static water purifier. This stays in one place and consists of a larger tank (1000L) and a filtration unit based on RO/DI. It produces 24 hours a day and can be visited continuously over extended periods of time. In conjunction with this, a portable storage trolley (not purifier) is used. This is filled and wheeled to the cleaning point and then used to deliver water to the various sized poles. The beauty of this is that it is expandable for a relatively cheap price. Just add another trolley and a pole and 2 men are working at opposite ends of a campus simultaneously.

## The Trolley bound Commercial Cleaner

There are some cleaners, especially abroad in Europe and the USA, that work like the DIY commercial operator. They take their trolley purifier to the client's sites, use their water and electricity and produce the pure water on site as it is needed. The hose reels and poles are chosen to match the heights of the work. When the facilities are present and the client is happy for you to use them (at his cost) this works well and means the vehicle you use can be smaller than a van mounted system would dictate. But in the UK, this cannot be relied on. The end user is not happy often for you to use his resources and always thinks the costs of doing so are much higher than the real values.

Most of the sales, in the UK at least, of these trolley purifiers are to contractors that already have a van mounted system or more. They want this for a particular job layout or as a quick filling device on site. Some use it as a stand-in static generator, but with the option of taking it to site as well. A very useful tool given the right circumstances.



Fig. 14

Do be aware of the waste water produced, that is seen by the client is generally unacceptable in this political climate.

## The One System at a time contractor

One of the largest groups of WFP window cleaners is the owner operator. He is often quite a perfectionist and insists on having the exact kit right for the job. His face is often seen by the



clients so he tends to care that little bit more. Some of the most elite cleaners around are part of this group.

The equipment is maintained to a high standard and tends to last the expected lifetime. He will often go for the highest quality equipment, knowing it to be the most economical choice in the long term.

5 The criteria is quite specific. A

medium sized machine (500 – 650L) is chosen and it is normally an RO model due to economy regardless of water TDS in the area. This leads to a medium van such as a vivaro, vito, transit etc. The payload requirement of the machine dictates this kind of van which will need a minimum of 1000kg PL. There's always excess space for other items used for other services i.e. power wash, gutter vacs etc.

The clientele can be residential or commercial, but the



medium sized machine will keep them working most of the day which is key. The commercial cleaner will need large carbon poles, but if only residential, the pole costs are lower for the average homes.

## The Multiple Van Outfit

When the larger companies commit to the safety of WFP's, they will inevitably end up with multiple van mounted systems. These can be companies that have ambitiously expanded from one van and kept growing one by one until a decent fleet was working every day, or a large facilities management company that has a policy change on ladders or starts providing Window Cleaning as an additional service.

Either way, the solutions are similar. They will both purify (generally) off site and transport water to site in vans. The systems should be at least medium sized but often the largest 1000L is used as each van usually has 2 men and a lot of water is used each day. There are 2 main options to consider for this outfit. Firstly, they can fit each van with a full RO system that produces water at the operator's home overnight, or they use a central static system and each van has a cheaper, more basic machine that just delivers the water to the site and pumps it up the poles. The static option proves more economical as you go above 3 vans in a fleet, but the flexibility of filling anywhere is sometimes more important.

Once you are dealing with multiple vans, you have multiple operators. The main issue here is respect for the equipment from handling, cleanliness and maintenance. You should consider choosing the more simple, robust types or brands of equipment as so much money is lost to incomplete jobs where equipment failure or breakage is to blame. You will never achieve the level of TLC that an owner operator will provide.

## The equipment itself

We will now look at an overview of the equipment and tools available in the marketplace. Whilst I will leave the intimate details to company datasheets and websites, I will provide pros and cons of the most commonly used items.

#### Pure Water Generators AKA Machines/Systems

#### **Smallest Units**

These are the types of low value compact filter systems used by the DIY'er or small business cleaner. Basically, they are drinking water systems, made in the Far East, generally, and based on reverse osmosis filtration to remove most of all water pollutants and minerals. They are made to fit under the kitchen sink and be fed from the mains water supply.

They all produce pure water, but to achieve <1ppm TDS, the drinking water (RO water) must pass through a resin (demineralising) cartridge. This is integrated into the system or sometimes added externally, but it needs to be there.

When you first look at these, you will be struck with how many additional filters there are to the membranes. As you now know, we really only need a particle and carbon filter before and resin after. That's 3. Some have 6. This is because of its origins. The filtered water industry relies on consumable sales. So some unnecessary extras get added.

They are now made in various output sizes from 50GPD (gallons per day – US gallons) – 300GPD. Some rely solely on tap pressure and some have an electric pump. Don't be too swayed by the companies that suggest theirs is made specifically for this industry as they're not, just modified, but nevertheless, they will produce pure water. Expect only half of what they advertise i.e. 300GPD – firstly, this is US gallons, so this suggests you will have 1095 litres per day. Count on 400 max.

I would suggest a 300GPD system with pump and integral 10" cartridge for resin that is refillable. Buy a TDS meter at the same time. All of the above systems are based on 10" cartridges. There are larger systems available that use 20" cartridges and are framed. All use additional pumps and the productivity of these is substantially more. But above this, you are dealing with commercial RO's and the water produced is always in excess of what you can take to site in drums.

## Van Mounted DI (Demin) systems

Fundamentally, they all comprise of a tank to store the water, a resin (DI) vessel for purification and some electrical delivery pumps for the WFP's.

Even though there are different sized resin vessels present, if these systems are filled with medium hardness (150 – 300ppm) water, the resin will become exhausted after only several fills of a medium sized system tank. If this is acceptable to you then fine, and there are situations where this is the case. But otherwise, if the system is filled with raw tap water it will need to be very soft (<60ppm TDS) to be economical i.e. Scotland, Wales, Cumbria.



The following points will all be applicable to the RO

systems as well as they are based on the DI structure but with just an addition of some filters, a membrane and piping.

**Structurally,** the systems come in 3 types and it revolves around the tank design. The tanks can be the actual structural integrity of the system from which everything else attaches to and it governs how the components relate to each other. The first of two types is the fully moulded one piece tank which has been designed with every aspect in mind to match each component and fitting. It is rotationally moulded so the quality and consistency is very high. The moulder can adjust wall thickness and materials of construction to a huge variance and fine tune the product to address requirements. There is only one company that presently provides this approach, but there are other moulded tanks that are used. They tend to be made for different industries and purposes and whilst very good at holding stored water, they do need additional strappings, brackets and frames to allow the filtration components to "bolt on".

Some of these "adopted" tanks are designed originally as static tanks and only bear the structurally integrity to hold water whilst sitting on the floor or a shelf. It is suggested they have baffles, but it is clear these are there to prevent them from bursting and bellying under the stored water pressure. However, these tanks are often placed in steel frames which provide the stability and strength needed. The frames are secured in the vans and you can see the components bolted onto the outside of the frames. This is generally the approach adopted by the DIY'ers, but when done professionally, they provide a reliable option.

There is a third type of tank, which is also plastic but is made from sheets and welded together to suit the size of the system made. They too, need the assistance of an exoskeleton of steel to mount in vans and carry the components of the process. You can recognise this from its "boxy" appearance.

Whilst on the topic of structural integrity, it is a good place to touch on the safety of these systems when added to vans.

<u>Crash Testing</u> of mounted machines has been tested by some companies and this requirement has become more prominent for the customer. Why is this? Ultimately, all the vans and vehicles we use to carry our machines are not designed with this purpose in mind. The floors and chassis' do not have specific recommended locations for the fitter to drill and

bolt in place the machines resting above in the van space. As a result, this job can be done very poorly and therefore unsafely.

So the first approach to safety is that the machine is designed to allow easy, safe installation and in addition it needs to be capable of dealing with the trauma of a serious accident. The crash testing addresses these issues as it is an independent body that tests and certifies and also films the event.

Whilst there are no legal requirements presently that dictate you must only fit a certified machine brand, it is something you should value when choosing which brand to invest in.

## How do RO versions differ?

Basically, they don't differ much. The above points are all 100% applicable to RO machines as well. All of the RO systems presently produced are the actual DI versions with additional filtration added. This is the same as the requirements for any other Reverse Osmosis process and will compose of particulate filters, carbon filters and then the RO membranes themselves. This will mean a little more pipe work and generally the appearance becomes a little more complex.



#### Some other differences amongst machines

Fig. 18

Now you understand the principle of the water treatment behind these products, let's look at some of the other physical and "marketed" differences you will be presented with.

For any business, back end sales (sales made after the initial large purchase) are an important source of income. So it is a good idea (for the business) to design their systems in such a way that the customer can only be serviced by the equipment originator. It occurs in thousands of business. It is also here too. This is largely present in the replacement filtration cartridges and medias. Some brands will place a lot of emphasis on these consumables and you will be tied in to this expense as long as you own that brand. It is all generally truthful and legitimate but not all essential. As long as you are very clear on the ongoing costs of ownership of these brands, they are a reliable choice.

Most machines use the same pre-filters, membranes and resin vessels. So, should you wish to shop around for your consumables it is possible to get the best prices for the same items. This approach is less costly than the speciality products you have no other choice but to buy. Again, all these types of items are adopted from the existing water treatment industry that has been using them for decades with great results. The sizes or capacities of cartridges or vessels are not of great concern. They work well and only the lifetime of each will be changed.

The membranes are all of the same generic design, but do come in varying qualities. They all perform well enough and should you need to improve production rates and purities focusing on increasing feed pressure will give the best returns. Most of the membranes are 40" with some smaller machines using 20". Both are 4" in diameter. These are low pressure industrial membranes. You can't see them from the outside as they are housed in vessels (membrane housings). There are the black and white "change" housings made from reinforced plastic and there are stainless steel housings. The steel housings are more expensive but will last forever and not deform when frozen. The plastic will last years, but can warp and misshape over time, especially if allowed to freeze. Don't let them freeze as the membrane will become permanently useless!

## Water Conditioners

Water systems used to remove calcium from the feed water are a good idea – but only serve to extend lifetime of the membranes, which can be considerable. However, the only effective and efficient water softeners to use are the stand alone external units that would be plumbed into the water supply of the building. The bolt on pre-cartridges that rely on manual regeneration are both undersized and too basic to give satisfactory membrane protection. If membrane longevity is important to you, then pay for a correctly sized ion exchange water softener that is salt regenerated to be fitted to the rising main. You won't look back.

Don't bother with any form of magnetic "water conditioner" that is fitted to the feed of the membrane. They simply do not provide significant protection.

#### **Power**

Some machines have batteries integrally fitted to power the delivery pumps and some have external batteries. Firstly, it is important to have the correct type and size. Normally, 100amp/hr and a gel deep cycle design. Gel for safety and 100 to last the day. These batteries are connected via a split charger to the vehicle batteries, so they are charged each time the engine is running. Small machines (250 litres approximately) will only ever draw a limited amount of power and so can be connected to the van battery, but the larger machines can sometimes drain the van battery enough to prevent it starting the van. So an auxiliary battery will be a sensible choice.

## Hot Water Systems

Dissolving a substance in water is a chemical reaction. For every 10°C rise in temperature, the reactions rate doubles, which means it dissolves the substance faster. This is why it is clearly more effective to wash your hands, or anything for that matter, in hot water as opposed to cold. Hot water will also disperse oils and greases better than colder water, again, we see this every day when washing up at home. So why is this all important here? Hot water



does clean windows better than colder water, but it's all a matter degree. It is not essential to use hot or warm water to get windows clean, but it is a little quicker and does give the winter operator an advantage

Most owners of hot water systems don't use it all the time. It is not necessary as cold water will do a perfectly good job, particularly if the windows had

now and then.

been cleaned previously, which is often the case of course. So the hot wash is always at its best in the initial cleans i.e. builders cleans or just the first time you clean a new site that's been neglected and is particularly dirty.



Fig. 20

The hot water machines or set ups come in two types.

- The integral heater
- The separate heater

The first is really the only real hot water machine as it has been made to function this way. The rest are standard cold water systems with a stand alone heater plumbed in alongside the system. They both heat the water fine. If you already have a system then the cheapest option is to add on a heater to achieve this so no need to trade your existing system in to go hot.

## **Diesel or Gas?**

The water heaters are fuelled in one of 2 ways – diesel or LPG (propane usually). Let's look at each in turn.

The diesel heater uses the same diesel as the vehicle and can either be plumbed into the van fuel tank or have its own dedicated stand alone tank usually about 30 litres in volume. Using the van tank is obviously more convenient as you only need to fill one place, but the separate tank does allow you to accurately monitor what you are consuming in fuel as this can add up to a significant amount of diesel. This is difficult to gauge when you take from the main tank. When faults arise it is a little easier to diagnose possible fuel feed problems with the separate tank, but generally other than that, both work well. Be aware that a few modern vans do not like the engine fuel feed line being compromised. The engine governor can react poorly to the pressure differences the diesel heater can produce but this is the exception rather than the rule. Check out this with the manufacturer of the van before the installation takes place. You can always insist on a separate tank if this is the case.

The diesel water heaters used are adopted from other industries, particularly the boat scene. These heaters are generally central heating system boilers or domestic hot water generators for washing with. They are very reliable but do in our industry have a higher failure rate than they are designed to give. This is because they are modified and when attached integrally to a pure water machine, the controls and electrics are not generally of the same standards. There are complete ready to go units that are not interfered with and just plug and play.

These represent the best reliability and allow you the warranty back up of the companies who actually make the heaters rather than the intermediate firms that have added the components to their branded tank systems. The manufacturer will always know more about these systems and often give a longer guarantee. The heaters come in two capacities of output. The one van usage which is around 5kw and if used to feed 2 poles will quickly only produce warm water and not be able to cope with the flow through of cold water. The other size is around 9 – 11kw. This can deliver enough heat for 2 poles continuously working. Either way, you will always require an auxiliary battery with these heaters as they do consume power to operate.

Generally speaking these heaters are all pretty good and as long as they are serviced and installed correctly you can expect up to 5 years plus of good service. This is also the safest way to heat the water compared to the gas powered heaters we will now come to.

#### Gas heaters

The Gas Heaters that are added to the cold water systems will always be mounted separately to the tanks in the vans. They are basically water heaters used for domestic hot water generation such as portable showers or direct water heaters in caravans or such. They need a gas bottle present, usually propane in the UK, and this needs to be replaced regularly.

They do however; produce a high heat output and even the smallest ones can comfortably feed two operators. The heat wastage is higher than the diesel heater due to the vertical flue design.

The installation of these units is much simpler than the diesel heaters. A specialist is not required. They can be easily added to any system by intercepting the pumped cold water before it exits the van. They are also "D Cell" battery operated so no need for the large auxiliary battery that the diesel heater needs.



Fig. 21

Safety is the main negative for these systems. That is not to say they are unsafe as they are used all over the world in their thousands, but they need to be respected as he flammability of the gas is very serious. They do of course have built in safety features to prevent gas leakage but even a poorly swapped gas bottle, if not tightened adequately, can lead to gas escape. However, if correctly installed, maintained and used, it is by far and away the cheapest system to buy initially and should you only need infrequent heat, then the ROI is very good.

Factors	Diesel	Gas
Safety	Y	Ν
Economy	Same	Same
Cost	£2,300 - £4,000	£200
Installation	N (Professional)	Y (Easy)
Reliability	Y(Best)	N (Good)
Pressure Tolerance	Y	<b>X</b> (<80PSI)
Heat Output	N (Good)	Y (Better)
Cost of Frost Damage	N (Expensive)	Y (Low)

#### Pros and Cons – Diesel or Gas

The main factor for the customers we have found is comprehending that the gas heater costs less than  $1/10^{th}$  the price of the diesel heater. The diesel seems to be the professional's choice but many do opt for the gas method. Both should be looked into before investing to make sure they meet your needs.

One final note on this, which is pertinent for the water systems in general, is that should you allow any freezing to occur, the damage is always significant and costly. Make every effort to prevent frost damage every winter.

#### **Cleaning with Treated Water**

There is a system based on the tank in a van concept that is designed as a none glass surface cleaner. Instead of filters and membranes and resin, it uses base ion exchange and removes all the calcium salts from the water but replaces them with sodium salts. Sodium is a main constituent of detergents and aggressively cleans the dirt from any surface much more effectively than deionised water. But when used on glass in areas of hard water, some mild spotting can be seen. Consequently, this is very effective on cladding, signs, solar panels and has by far the lowest running costs of any cleaning machines. The weekly consumable costs are only a few  $\pounds$ 's and it has the ability to be refilled numerous times on site acting like and delivering like a much larger system.

When volume and surface area is the issue and you do not need a pristine glass finish, then the Base Exchange system is the most cost effective and reliable system around.

## Purifying Trolley Systems



Take all the filtration and pipe work and pumps from an RO or DI system and reorganise them on a frame with wheels. You've made a trolley system. This is not to be confused with the access trolleys that only carry and pump water already purified. These purifying trolleys do the lot. They basically replace the tank with a portable frame. They do not and cannot hold or store pure water as they have no reservoir. They are made as a "point of use" purification unit that generates water onsite as it is required. It uses the client's onsite water system and supply. Most also use the clients electricity when they are powered by 240V pumps. Some do however, come as battery powered units or can use the buildings water system pressure should they not need to clean so high. They are designed to space save primarily and eliminate the need to carry around large volumes of water.

So if you want to use one of these, you must have the following situations and resources available:

- Have the ability and the permission to use the client's water supply and they need to be aware that the system, if RO, will waste at least as much water to drain during the process
- If your trolley is not powered and relies on water pressure, the site must be able to provide adequate pressure to reach and clean effectively
- If your trolley is powered by mains electricity and not battery, you need the use of your clients power supply. If not, you will need to provide your own generator power from your van



 Often the water supply onsite can be a long way from the cleaning locations. You will need adequate lengths of hose to deliver to your machine or poles. Consider hundreds of meters sometimes

#### What is available presently?

- 1) <u>**DI trolleys**</u> a trolley with a resin bottle strapped in place. It relies on water pressure and needs frequently recharging with resin
- 2) <u>RO trolleys with no booster pumping function</u> They provide poor flow and will only be adequate for the lower levels as long as a mains water pressure of 40 – 50psi is available. Even if a higher pressure is available, often only one WFP can be used at height at one time
- 3) **RO trolleys with a booster pump**. The pump is either mains electricity powered or battery powered. The mains powered units are either 240V or 110V (ac). These are the most capable and powerful units available. This is due to the unlimited power they can deliver. It is common for units to be designed that can produce 300-500 litres per hour. They are even used in place of static framed systems that produce water onsite in bulk. When you need the best performance and volumes of pure water, this is the type of option to go for. The battery powered trolleys differ only in the output of the booster pump and the presence of a big 100+Ah gel deep cycle battery. They will, if designed to, feed 2x 60ft poles simultaneously but this is generally their limit. The battery will also be a limiting feature in some cases. The size (100+Ah) is usually adequate to feed the system for a full day, but if pushed hard and not in very good condition, it will start to deplete and effect pressures and flow rates. However, regular maintenance checks and correct charging will provide satisfactory performance. The weight of the trolley is considerably increased with the battery and often a ramp or assistance is needed lifting in/out of a van. All this considered, the battery powered version is more popular than the 240V systems because of its versatility onsite. Dependence on an external power source can be limiting.

- 4) <u>Combined RO/DI trolleys</u> There is a trolley that relies on mains water pressure solely but gives the option of switching between DI and RO produced water. The philosophy is that lower work can be reached with the water produced solely by the RO membrane, but if you need to go higher up the building, you can direct the feed water just through the resin (DI) alone where the pressure drop is reduced. As mentioned above, you will be subject to the limitations of the sites water pressure. So a 2 man operation will not be effective and often you may find yourself having to use the DI option even for mid range work. The consumable costs will always be higher than straight RO and the membranes more susceptible to blockage than powered systems. But as long as you are aware of this, the equipment will clean effectively.
- 5) Reservoir Trolleys As mentioned earlier, there is a need to transport water all around a location to address the areas needing to be cleaned. We use a more basic trolley system for this. This trolley has a small tank that is filled with the already purified water. This can be 25 – 125 litres. They all have a pump and battery and are capable to feed a 60ft pole adequately. Due to its nature, this is probably the most abused (next to some poles) item in the industry. It gets physically beat up every day, in many ways. So pay attention to build quality, durability and the warranties that suppliers give you. Breakages due to accident or misuse won't ever be covered, but they are prone to electrical failure more so than the similar van mounted machines. The main issues arise from the batteries used. The best are 38AMP gel units such as you find in a golfing trolley for example. The batteries are good, but they need regular changing. If left flat for a period of weeks, they often lose a large percentage of their capacity and will need changing. It is common to use them infrequently on certain jobs. Just make sure they are left fully charged when stored for a while. The switches and pumps are also exposed to the elements and trauma, so expect a shorter life with these items and be clear on warranty terms as they will vary dramatically. Finally, frost damage is lethal to the trolley. Don't let it happen!

#### **Onsite Static Systems**

For the customer who needs the largest quantities of pure water, the static system located at their premises will always be the most effective option. This comprises of large volumes of storage capacity upwards at 10,000 litres in some cases, but it can theoretically be whatever you want. Then, the generating module is added. This can be of



any size as well. Due to the fact that it is located inside a building, there is easy access to electrical power which allows any production rates you desire.

These systems are categorised by the volume of stored water and the volume of water produced in a day. The relationship between these items is that the storage is normally close or a little below the production rate because at the start of the day, the vans will need filling to go and do the work. This water will be taken at the same time from the tanks to fill all the vans, so the system will not be able to produce water at this rate.

The sizes most commonly sold are the 1000 litre and 2000 litre systems, although there are window cleaning systems of up to 10,000 litres being used. You should always try for a system where the generator is capable of producing more in one day than the storage available. This allows you to increase your output for a small expense of an extra tank and some plumbing. It's because of this expendability that the static systems provide a much better economic solution for the multiple van/machine operators. Just be aware that this is an indoor setup at all times so you do need that facility.

The smaller statics can be designed to just rely on the incoming mains water pressure to produce the pure water. When locating in an industrial unit, the pressures are usually higher

than domestic sites but this is not guaranteed. However, 50 - 80psi plus will be adequate for 1 - 3000 litres per 24 hour period. So this is still an overnight filling situation with a morning van fill. The problems arise when water pressure is too low onsite. So check the pressure with a gauge before opting for the mains feed statics.

As soon as you use electrical booster pumps, the production rates achievable are limitless. But so too is the expense. The smaller boosted units of 1000 - 6000 are the best combination of delivery and expense. Don't be caught out by the name of them either. Firstly, if quoted as 500GPD (gallons per day), you must know they are not UK gallons, they are US gallons (approximately 3.6 litres). So it is better to work in litres when possible. Also, this will not mean (most of the time) that you will get 500 gallons per day, as these values are the maximum amounts possible under ideal conditions, which means pressures and temperatures – for example, most membranes produce best at  $20 - 25^{\circ}$ C feed water. That's just not practical here in the UK, but still you will get quoted this very often. A good rule of thumb is that for every 1°C below (or above)  $25^{\circ}$ C, the production rate will be <u>reduced</u> by 2%. So in winter, when the tap water we get is  $5^{\circ}$ C and we use this to fill our systems, the production rate will be 40% lower than the quoted rate. So always find out what the <u>actual</u> production rate is going to be and do not be satisfied with someone telling you it is whatever the tank sizes are. This will show they don't have a grasp on the facts and you could easily end up with an under producing system or at least one that cannot be expanded in the future.

The maintenance of the statics is probably the easiest to do. All of the components are exposed and accessible. The principle will be the same as the van mounted systems. There are pre-filters and resin to replace and the membranes will have a similar life span to all the other systems, but often you will find they can last considerably longer because of the automatic flushing programmes most powered systems have. If however, you want the maximum life from a membrane, then the static should be fed by a water softener that removes the harmful scaling calcium salts. This will often extend the life span up to 5 years.

#### **Hose Trolleys and Hoses**

Most operators have to deal with hoses in one form or another. There are a large variety of types of hoses, mainly varying in the material and method of construction.

Sizes can be found as follows:

 $1\!\!/\!\!2$ " internal bore in 50m lengths – used on hose trolleys normally portable wheeled ones, to feed WFP's from a system. Very good flow rates, especially for 2 operators

8mm (ID) in 100m lengths to feed WFP's – found on all trolleys including van mounted. Gives the distance of 100 meters from only one reel. Not always adequate for 2 WFP's

6mm ½" (ID) – Sometimes used on hose reels, but not by many. Keeps the reels to a minimum, but is only for 1 WFP and does cause pump problems due to increased back pressure and drag. Pumps can fail within 6 months of using 6mm. Its main use is for the poles themselves, from the base to the head. Best to use it this way and have a larger bore for delivery. The hoses are made all over the world and for all kinds of applications and industries. So it is easy to buy the cheapest and end up expecting too much from it. This industry use is quite extreme for hoses. Even thought the pressure used for the poles is not much more than 100psi, this hose has become an expendable item. The minimum pressure rating is 100psi but I prefer 150psi. The higher, the better.

Then you have to consider "kinking". The hoses are dragged around all day and if the walls are too thin it is easy for a "kink" or fold to form, stopping the water flow. They are all called "anti-kink" but some more so than others. Generally the high pressure hoses have best anti-kinking qualities and these will always cost more than the rest.

## Fig. 24



Technically the term used to describe the flexibility of a hose is its "shore value". The higher this is, the more flexible it is throughout a larger temperature range as during the winter the hoses can become very stiff and make the job a lot harder.

The average hose will cope with hot water in most cases, but if you are a frequent user of hot water, use a hose designed for hot water as it will not soften too much and make working that little more efficient.

By far, the most damaging practise for the hoses is dragging them along the pavement or roads whilst winding back in. This rapidly thins the walls and causes bursting. Walk the end of the hose back to the van; it will save you money and grief.

Finally, 2 more things. Don't let them freeze and don't let trucks run over them even if you are told they can take it. No one will ever give you a written guarantee on this for a reason.

The hose reels come in 2 types. The first and most popular is the portable one, usually with wheels. This is secured in the back of the van whilst in transit and then taken out and placed next to the van whilst cleaning takes place. These need to be very durable as they take a lot of abuse. The stronger the better. Don't even think about using the plastic B&Q type hoselock reel. They won't last a week. Most are made entirely of metal and will hold 100 meters of 8mm hose. Expect 12 months life even from these. The swivel elbow joints will give you the main failures but you can purchase high quality units that can cope for the lifetime of the reel without issue, if you wish to spend the money that is.



The second type is the van mounted units. These are physically bolted through the floor of the vans and do not move. Consequently, they do not receive the damage of the mobile types and tend to last longer. There is presently one type on the market that comes with a lifetime guarantee. These are usually built sturdier and should be considered especially when you have a number of "hired hands" to do the cleaning. The extra expense pays dividends in saved time and leaks.

For both hose reels do pay attention to the company warranty offerings, it is important for items such as these. Most website shops offer little or no guarantee for the kind of damage that occurs.

## Water Fed Poles

The water fed pole has had a fast evolution and continues today to get better and cheaper. Below is a precise description of what's out there in the marketplace and a little about the pros and cons of each type. This is not an exhaustive list, but will include the choices of the vast majority of window cleaners. For the finer details of each pole, you should inspect the company datasheets, as these points can change rapidly. But by and large there is a competition amongst the major brands as they all strive to get the fundamentals to the highest standards possible. The window cleaner owes a lot to the passionate efforts of the suppliers who invest in this effort. The weight, flexibility and strength of the poles varies from brand to brand and within a brand too. Before you invest, you should decide what's most important to you in your particular circumstances, i.e. some may choose to purchase regularly at the lower cost end of the range whilst taking advantage of the new innovations that arise, but another may go for the top of the heap pole and spend accordingly but happy in the knowledge that it should have a long and relatively trouble free life span.

So let's categorise the available poles.

## **Telescopic Poles**

- Glassfibre
- Aluminium
- Carbon/glass mix (hybrids)
  - Full carbon standard
    - High modulus



## **Modular Poles**

Carbon – standard

 High modulus



## Telescopic extended by modular

- Carbon hybrids
- Full Carbon standard
  - Higher modulus

The clamping systems are generally of two types. The levered type and the twistlock. By far and away, the levered type is the most popular and the best received around the world. The lever can work in 2 ways – vertically or horizontally (transverse). They both utilise a sliding cam face and adjustable tightening to accommodate the wear and tear of cams and tubes (sections). The original type was the vertical lever, then joined by the transverse which allowed a shorter collapsed length due to the shallower clamp body.

The fundamentals of pole design can be summarised into 3 areas.

- 1) Weight
- 2) Rigidity or Flexibility
- 3) Strength or Resistance to fracture

It is mainly the materials of construction that govern these 3 areas the most. But clever design features or methods of construction i.e. structural layout can also contribute and affect the outcome.

## <u>Weight</u>

The same volume of the different materials will give different weights. The aluminium tube will be the heaviest, then the fibreglass, then carbon/glass hybrids, then full carbon and finally the specialist carbons. The largest difference is with aluminium and the others are surprisingly close to each other. But different poles will be made with varied wall thicknesses because of these qualities. A thinner walled carbon will seem significantly lighter than a glass fibre pole of the same extended length, not just because of the material weight, but because the carbon can achieve the same rigidity as the glass fibre but with less material due to its superior qualities. So the design has to be appropriate for the intended usage. This results in some generalities, such as the longer 50ft plus poles will always be a carbon of one grade or another.

The heaviest poles are the aluminium and the fibre glass. Even though aluminium is a lot heavier than fibre glass, it can be extruded or drawn into very thin walled tubes, whereas fibre

glass needs a thicker wall to achieve the strength needed to do the job. So the strength of the material contributes to the design. In some cases, the alloy pole will be lighter than the equivalent fibre glass pole.

Carbon Fibre materials have contributed a great deal to the WFP industry. Not only is the material lighter than fibre glass, but it's rigidity and strength are also greater. This allows the tubes to be made with a thinner wall, hence less material and even lighter again tube. If you mix carbon with fibre glass (hybrid) the resulting material is stiffer and a little lighter. A 50/50 mix is usual. So should you choose a full carbon pole, the overall weight, rigidity and ease of use is quite dramatic.

The following table gives some comparative weights of the 4 materials. But remember not all poles will be made in the same way with the same quantity of material.

The rigidity of the different poles is of the same if not more importance than the weights. Controlling the brush head at the end of a long pole needs rigidity. Without this the work is inaccurate and time consuming.

There are no hard and fast rules for what the materials should be for certain applications. For poles in the shorter range of up to 20ft, the rigidity and weights of all 4 materials are adequate and you will find most 18ft poles to be fibre glass and aluminium. More hybrids are entering this range now as the costs are coming down on the carbon based poles. Even full carbon poles below 18ft are available at a cost giving amazing light weight and rigid poles. As the lengths of poles increases, the materials start to separate out. Generally it follows this pattern:



It is always possible to make a very lightweight pole from any of the materials by just making the tube thicknesses as thin as possible. This even gives a rigid pole at the shorter lengths. But it will just lead to fracture. We need strength in the structure to be practicable. Increasing wall thickness is the easiest way to achieve strength of course but we must consider the weight increases that accompany this.

Let's look at the material strengths first. The 3 composite materials (fibre glass, hybrid and carbon) will fail under stress by fracturing. They can also shatter under impact. These qualities can be influence massively by the structure of construction. Using multiple layers of materials with varying overlapping orientations, the strengths are increased and wall thicknesses kept to a minimum. But they still fracture, albeit at higher tolerances.

The aluminium will firstly bend before breaking in two. There are many gauges of aluminium tube and they all offer different strengths and qualities. Without going into the extreme engineering possible with all these materials and just considering what is actually used in this industry, the strengths are as follows:

	Fibreglass	Aluminium	Hybrid	Carbon
-				
F	lighest Rigidity			Lowest Rigidity

That being said, suppliers are constantly trying to improve the qualities by using different combinations of the 3 main principles.

#### What types of poles are used?

#### **Telescopic Poles**

This is by far the most common type of WFP. The sections are progressively smaller from the base handle upwards and they collapse down inside the next section below. This means that the higher the section, the smaller the tube diameter and therefore the more flexible it is. So when a pole is made from a suit of compatible tubes, it is created from the top, down. So to speak, i.e. a 7ft pole may be made from lengths of the two top sections or maybe even three. The top sections will be common to all the poles; it is just a matter of adding larger and larger sections over the base handles.

**The more sections used**, the greater the length of the pole and base section diameter. Now because there are no rules to how long a collapsed pole should be, the manufacturer can achieve the same extended length with more than one combination i.e. a 25ft pole can be made from 4 sections or 7 sections. The collapsed length will decrease as the number of sections increases. But of course, the base section diameter will also increase. The size of the handle diameter is important and needs to be kept to a minimum for comfort and to reduce repetitive strain injuries. So the largest diameter tubes are normally kept for the largest poles.

With this in mind, if you purchase from a manufacturer of poles as opposed to a "distributor", you should be able to specify points like collapsed size and section numbers. These are limitless of course, but if your storage requirements dictate a length, it's worth asking for.

**Some brands** of telescopic pole can be separated to make a smaller pole. This is useful, but be aware that damage to the base of an otherwise internal section will render the whole pole useless. Make sure there is a sensible system to protect from this occurring. Avoid the temptation to logically decide on just purchasing the large pole to do all the work, as it is theoretically capable of reaching to any length up to the maximum length of the pole. It will simply be too long to work with all day - even the lightest pole on the marketplace. Use the right sized pole for the job. A super light 6ft for ground floor will be used every day. Then an intermediate 18 - 25ft for first and second story work. Above this, you can go to 40 - 45ft and then a 60ft for the rarer jobs. This is the best approach as you will work best with the lightest smallest pole and cut fewer corners – it is generally safer as well.

**Collapsed lengths** need to be such that you can reach all the clamps. It is generally better to extend the pole vertically, so 2.5 meters collapsed length is maximum before it becomes cumbersome. The largest poles (60ft plus) will be larger than this due to the number of sections available, but these poles will need to be raised, extended from the ground like a ladder and should be a 2 man technique.

Telescopic poles are made from all the 4 materials mentioned. There are excellent examples of high quality poles in most sizes. As long as you consider the fundamentals mentioned earlier, it will just be a matter of personal preference which brand you use. Pick a clamping system and brush head that works well for your operating style and be aware that there are a lot of interchangeable possibilities between brands, so you can create the perfect personal blend.

#### **Modular Poles**

These are poles made from separate sections that lock together end on end, to create a pole of a desirable length. A kit will contain up to 10 or 12 sections, usually around 6ft each. One will be the permanent top section and you add to this as you need to. The idea being that when you clean at 6ft, you only use one section – so minimal weight. When you want 18ft, you only use 3 sections, so you constantly only carry just enough to do the job.

<u>They are easy to erect.</u> You add from below and push the upper sections up the building. Lowering is the opposite. The sections can be tapered as is the case with one brand. They fit together with friction. They do have a tendency to join very firmly together however and render the pole useless. Also, if on section is broken, the pole cannot be used at most



heights, because each section is a different size.

The better modular sets are made from equivalent tubes which are interchangeable. Should one break, then you are only limited to cleaning 6ft below the full set height. This type also connects differently and is not prone to the jamming issues the tapered poles have. Presently, there is a screwed union fitting and a spring button, quick release type mechanism. Both work well.

The tube diameter is often quite large and when working at low heights, can be a little uncomfortable. The stiffness of the sections create a different feel at lower heights as there is zero flexibility, which is needed for control of the brush head, but you can get used to it and produce the required results with practise. The kits will come in a bag and can be quite cumbersome, but whilst bulky, the short length means you can get a 60ft pole set into a Berlingo, which is more than can be said for a 60ft telescopic pole.

This is actually all an operator needs regarding poles as it reaches all heights and addresses the weight issue. But I always find users seem to always have a small telescopic pole or two snuggled up in the back of the van for one reason or another.

Due to the fact that the modular pole is really at its best when it can provide the full height range they are inevitably made from full carbon fibre sections. These are therefore priced at higher ranges. It was in these poles that a higher specification of carbon fibre material was first used in this industry. Today, the "high modulus carbon" is quoted by most of the manufacturers on their best and most expensive models. This is used in telescopic poles as well, but a little caution is required before assuming you are comparing apples for apples here. There are different grades of carbon fibre and as soon as a variation is used from the standard carbon materials, it is declared as "high modulus". Well it may be higher modulus rating, but not necessarily "high mod". The average carbon pole is made from a standard material rated at 33MSI. MSI is a measure of stiffness.

There are grades that have values of 42MSI (normally referred to as intermediate modulus) due to a further processing of the fibres. The processing makes the fibres smoother, allowing a denser union between them. High modulus fibres need to be refined to around 55MSI before they can truly be classed in this category. Due to the extended processing and extra care needed to achieve this, the fibres become rapidly more expensive. High modulus poles will always be the most expensive in the range offered. One further point you may come across in variation is the appearance of the carbon fibre surface. This is because the fibres are woven into sheets of "material" and the strands of carbon used are bundled together and then woven in a particular pattern. The number of strands in a bundle gives the cloth a "K" factor. K = 1 thousand strands. A common design for our industry is the 3k matting which is normally put together in a criss cross pattern.

#### Pole hosing

By far and away, the most common technique used for dealing with the pole hose is to have it inside the telescopic pole. As the pole extends and collapses the hose is drawn or pushed through the pole. This works well. It has been claimed that the hose around the feet is a hazard, but thousands of operators would not agree. A good technique will address that danger. The main issue is that the pole end damages the hose and results in replacement. But generally, not before it is time to replace the hose anyway. It is important however, to give the poles a little maintenance as instructed and clean down the tubes and hoses regularly to reduce abrasive grit that can build up and cause stiffness in sliding tubes.

An external hose is sometimes used on telescopic poles, but not often. It is modular poles

that use this set up and for no other reason than it is a pain to remove and add sections if the hose has to pass through the middle, regardless of what they tell you. So internal - telescopic and external - modular.

The same tube qualities apply to modular's as they do to telescopic poles. The lightest poles will have the most breakages and the heaviest poles will not have the reach and rigidity of the others. Presently, there are 3 brands of completely modular. One very light, one mid range and one heavy. The lightest is a tapered system and the other 2 use same diameter sections all the way with more involved unions.



Fig. 30

## The telescopic/modular hybrids

The third type of pole after the telescopic and modular system is simply a combination of the two. A telescopic pole is made for a certain height (around 30ft) but it allows for additional sections to be added to the base, so one by one, the telescopic suit is raised to the desired height. This works because the upper sections are the smallest and lightest causing the least overall flexing. The telescopic part can be made from lightweight carbon or often carbon / fibre glass hybrid. The extensions also can be varying materials, sometimes hybrid, sometimes carbon.

This approach helps you start with the lower pole and add to it over time as your contracts or work evolve to higher levels. You do however, bring together the features and issues of both designs i.e. extra separate sections – inconvenience, storage, external pole hose. Good collapsed length and speed of set up.

#### The business end of the poles

Whilst the water plays a big part in cleaning the glass, it couldn't do it without the help of the brush head. In actual fact, the brush head does the largest part of the cleaning, which is down to agitation and scrubbing of the glass surface. The water primarily, is used to just physically wash down the dirt from the glass. Once visibly clean, the water rinses off the contaminated water and leaves droplets of pure water to evaporate clear.



Fig. 31

Before we focus on the brush, let's talk a little about the

goosenecks (attachments of brush to pole top). It is necessary to fix the brush at a certain angle to clean the glass correctly. But the pole angled from the ground is not anywhere near in the right place. An angled section usually around 45° is attached to the pole top and this makes up the right surface contact. This is a short section, so not really a large contributor to the head weight, but even these have been made in carbon fibre, aluminium, steel and

plastic. Again, the fundamentals apply, but strength is most important as this end of the pole is constantly hitting the floor or wall or window and receives a lot of damage.



The poles are dropped a lot more often than you expect. Especially if you use employees. It is generally the brush head that snaps in two these days as most goosenecks are very strong, however, they do bend or break from time to time. Because of the array of situations a cleaner has to address the needs differing goosenecks. The fixed necks are between 6" to 20" long. This allows the brush to reach the glass of the window, which is often inset from the window sill. Some sills are very deep and need as much as 20" when at high level. However, most jobs are addressed with a 10" gooseneck. Probably the most common neck is the plastic adjustable crank. It is only short (around 4") but allows you to adjust the

angle of the brush in a range of 300°. It's very useful and cheap. A must to have amongst your arsenal. There are cranks with a longer shaft, around 8" if you need them. The brushes vary in design and appearance, but there are only a few real differences to speak of.

**The bristles** are artificial (except for horse hair in the USA) made from nylon or polypropylene and are made to have great flexibility and memory. The longer the bristles, the greater the tendency to eyelash (curl outwards). It will wipe across the glass as the direction of travel changes. This has its place, but can produce



poor results on very dirty glass. As the bristle shortens, it becomes stiffer and creates more of a scrubbing action as the tips of the bristles do more work and produce a more abrasive effect. So the first and most common brush head has just one length of bristle that is the correct length to produce both of these effects, known as <u>"single trim"</u>. Then, a brush head can be made with an inner, shorter set of bristles with an outer, longer set, giving the ability to improve scrubbing effects when needed by applying more pressure on the glass. These are <u>double trim brushes</u>.

This multiple trim technique is duplicated in lots of different brush head shapes and is worth trying. But a good operator technique will adapt to whatever type of brush and be the biggest factor in end results. You can find brushes with a bristle that has had the tips abraded and this creates a fluffy or soft effect. This is called "flocking the bristles". It is used to help gather fine dust and debris that would otherwise pass through the stiffer clean cut bristles. It is also done because the brushes are designed to be used dry as well as wet. This is used mainly for the automobile industry as they need the softest surfaces due to the expense of the cars finishing. These brushes work with the WFP but some say they hold debris for too long and don't allow it to wash away. This may be the case, but only to a small degree. Some cleaners swear by this type and will use nothing else.

**The shape of the brush face** has some variations as well. Most brushes are rectangular (the 10" single trim rectangle head being the most common). But they are made from 4" to 25" long. The wider the head, the fewer strokes needed to clean large glass faces, but it comes at the cost of extra weight. It's a user's choice. Some would rather have the lightest head and increase the strokes, it doesn't really matter. The square ends of the brush help clean into corners of windows better than oval shapes, but less and less oval heads are sold these

days. The curved face is very useful. This sends bristles out in a fanning shape which matches the rocking action of the brush head. They are sometimes called "Sill brushes" as they can be lowered to the bottom of the window and the curved bristles can clean the horizontal face of the window sill. Flat faced brush heads will not do this. Ultimately, it's relatively subjective. Start with the standard heads and add as the situation dictates.



Fig. 34

## Chapter Seven

#### How to use the equipment effectively for profitable results.

Now you have the correct types of equipment to do the work you want, let's make sure that your profit isn't whittled away and you get the maximum return for your efforts and investment.

The first place to start is to ensure that you are in the correct marketplace, we have discussed this previously. Secondly, and this is a big point, you are charging the correct money. This too was discussed at length in previous chapters, but worth repeating again and again. Resist the temptation to sell on price. Know your profit requirements before you quote. Let's say you are on the right job at the right price. The next factors to be aware of are speed and efficiency. If it takes 2 days to do a ½ day job, you're on a loss. If you have to return to the site to redo the job or part of the job, you're on a loss as well. So what to do?

Cleaning with poles can be twice as fast, if not more, than cleaning with ladders. You must take advantage of this and focus on the techniques that speed the work up. More jobs done in a week/month equal more profit. Your overheads are the same on 15 jobs a month as 25 jobs a month. So the careful planning of the job programming is essential. Group job types i.e.  $\frac{1}{2}$  days, group areas/regions. The less time spent on the road between jobs, the better.

Take advantage of daylight hours. Travel early in spring and summer whilst light and roads are empty. Avoid rush hour later in the day. A lot of guys work 5am – 4pm and swear by their productivity. It may seem obvious, but if you were a traditional cleaner and now a WFP'er, then you can fit in more jobs in the same time each month. Do you do this or do you enjoy the extra time? There's extra profit right there.

#### **The Cleaning Techniques**

You will hear slightly different details of procedure and technique from various cleaners, but let me give you the fundamentals. You can customise your techniques as you become more experience. We have spoken about the relationship between speed and profit. A good technique will also be one of the quickest procedures, but this time advantage is lost if you have to return to site to redo parts of the building. This arises because the windows are left wet and any streaking or spotting will only become evident on drying.

The cleaning process is a two stage procedure. Firstly, the agitation of the dirt with the water to create a solution and suspension of insoluble dirt in water. This breaks the dried solids from the surface of the glass and frames and loosens them for mobility. The next stage is the rinsing. The fresh clean and TDS free water is sprayed onto the mobile debris and gravity helps wash downwards off the window.

Before you can start on the window, give you job a little thought. Extend the hoses from the van (if present) to the furthest part of the building, so you are working while walking back towards the van. This is best because the delivery hose becomes quite a nuisance and heavy if you are dragging it with you constantly as you move away from the van. Extend the hose first, to reduce the weight as you move across the building.

It is not always the case, but the dirty water from the upper windows can run down the building and dirty the lower windows, so it is normal practise to start with the top windows or higher windows. This means using the larger poles at the start of the jobs. As the brush head is a distance away and you cannot see closely the effects of the brush bristles, you have to rely on the technique to do the work thoroughly.

- Start with the top of the frame, moving side to side.
- Then move down the side frames on each side, up and down several times
- Onto the glass LHS and move zig zags up and down and across to the RHS then back again
- Drop down to the base of the frame and move left to right, brushing the lower glass and horizontal frame



Fig. 35

The agitation has now covered the entire surface area of the window frame and glass. The first time you clean a window or after it's been left a few months, the level of dirt on the frame will be high enough for you to clean the frame first as just described. But if this is a regular clean and the frames are satisfyingly clean, you need only confine your agitation to the glass alone. Either way, special attention will always need to be given to the corners of the window. It is a common complaint that when dry, the corners seem untouched and show a misting of dirt.

The majority of dirt has already been removed at this stage because of the constant spraying during the agitation. Dirty water will already be running down the walls of the building, but this still leaves contaminated water on the glass in droplets. The rinsing replaces these droplets through dilation with very low TDS water that does not leave any spots or streaks.

To rinse, the brush head needs to be held away from the window (around 8 - 12 inches) and the head is moved from left to right a couple of inches between lines.



Try to confine rinsing to the glass, unless the frames are particularly bad. Keep the pressure down on rinsing as too much splashing about sends contaminated water droplets everywhere, even above the brush head.

It is very common that after a first clean with purified water, the client will experience white streaks or spotting on the glass. You will be convinced that you did a thorough job and confused as to why this happened. As long as your TDS is 000ppm with your meter, you can be assured that you did not add any minerals to their windows, but it does look that way. Why is this common? Because the window has been cleaned, for years sometimes, using a detergent of some kind, with a squeegee and even though it rains on the glass, an amount of chemical is drawn by capillary force into the window seals. As you add purified water, this too

is drawn in and dissolves some soap. This soap solution stays there and sometimes after you have left and it has reduced a little by evaporation, it will run down the glass and dry, forming a streak. This will sometimes happen even if detergent hasn't been used, but not as badly as a soaped window. The only solution is to rewash the affected area only and avoid too much wetting. It will reduce dramatically during each wash and the worst doesn't usually last more than 3 - 4 applications.

#### Water Costs

Another significant factor that effects the costs of your work and hence the profitability is the cost of your water. You may sometimes be able to use other people's water source, but generally you are paying for it. So consider the following:

- Use a water saving device on each pole such as a trigger or a shut off mechanism that allows you to stop flow between windows. This easily saves up to 30% of your water consumption.
- If you work from a commercial site, you can claim for dispensation from the water board because you are not putting all the water to drain. It's leaving to go to site.
- Rain water harvesting can be very helpful and not only does it save on the water board utility bill, but it saves a lot more on resin. Consider a system for this; you need a big tank, some drainpipe plumbing and a booster pump. Payback in the first year.

Paying attention to the points made here will help maximise your income from working this way. It is easy to just dismiss the small things but they reoccur so frequently that soon they add up to significant profit influences.

## **Chapter Eight**

#### <u>The important facts to consider when maintaining your equipment for</u> <u>maximum performance.</u>

When you are up and running with WFP equipment, you will find you can categorize it into 3 types:

- a) Machine in van or trolley this generates the water and delivers it to the poles
- b) Accessories that assist the categories (a) and (c) bringing together
- c) The poles

You will also know by now that this equipment is heavily used and takes a great deal of knocks. The durability of kit can vary from supplier to supplier, but it all needs attention at regular intervals. The suppliers that provided you the equipment will no doubt give you direction on servicing and maintenance and this advice will vary from company to company. But don't do what a lot do! That is buy it, fit it and run it until it stops, then demand warranty service. Most suppliers will decline and rightly so.

Most brands of systems now allow a DIY approach to servicing and maintenance. The consumables are easy to replace and most components are a bolt on bolt off arrangement. They will all expire at different times for one reason or another. I will give you some realistic life expectations below and what to do about these.

You will be tempted to just run every component to failure and deal with each as it happens, but think again. Firstly, nobody ever carries a spare everything for their equipment. In actual fact, the large majority carry nothing at all. When the failure occurs, it's panic stations as often the system is no longer working and earning money. Even worse, there are now 2 guys being paid to do nothing. The supplier can often be out of stock and the delay can cost days. When the parts finally arrive there can be issues in the fitting and a visit to the suppliers is

necessary. This only has to happen a couple of times a year and you are out of pocket  $\pounds 1-3k$  easily.

Be aware also that, as you learnt in previous chapters, the water chemistry will vary vastly around the country. You should expect in advance that this will affect the performance of your system.

Some things need more of your attention, time and money than others, so let's review some of the most common ones:

#### Life Expectancies

Item	Life Span	Comments		
40" Membrane	6 months – 2 years	Harder the water, shorter the		
		life – flushing plays a big role		
40" Membrane fed by softer	18 months – 5 years	This must be an independent		
water		automatic professional unit,		
		not just a cartridge		
Tank ball valve	12 months			
Digital switch for pumps	12 months – 2 years	Fusing the feed helps reduce faults		
12v pumps for window poles	12 months – 18 months	Using small bore delivery		
		hoses make pumps work		
		harder and reduces life span		
		dramatically		
Lead acid gel batteries	12 months – 18 months	Leaving discharged for an		
		extended period will damage		
		it permanently		
External hose trolleys	12 months – 18 months			
Internal hose trolleys	5 years	Make sure you get a		
		guarantee on this time		
1/2" and 8mm trolley hose	12 months	Pavement friction can		
(50m, 100m)		seriously reduce this life. Get		
		the correct hose for hot		
		water.		

Let's investigate what you can do about the problems that regularly occur.

#### **Membranes**

This is the most expensive bill you will regularly get (approximately £300 for the larger membranes). Firstly, accept that you will not receive a faulty membrane from a supplier. These are carefully tested at the factories they are made in, in Japan, USA, Taiwan etc. If it produces a poor product flow when first filling, it is either a higher pressure rated membrane or your input pressure is too low and needs increasing. It will not be blocked up, as I have heard accusations of many times.



It is just a fine filter. So it will catch and hold almost everything except water. So make sure you change the

pre-filters (5 micron) before they become completely blocked. Every 3 months is good practise and they are only cheap items. Next, it needs to be flushed regularly. The more, the better. At least once a week for one hour. The commercial RO machines flush the membrane automatically every time it is powered up or if it reaches a certain TDS product. Next, increase the input water pressure. Below 40psi, the production will be very poor. Below 30psi the TDS is too high in the product and it will be scaling up at a rapid rate. Often only lasting 3 - 4 months. So if the site pressure is poor, use a booster set to raise it to 60 - 80psi or higher. Not only will you half your resin usage, but the life span can be increased 3 - 4 fold. Finally, any instance, no matter how long, of freezing is so destructive to the membrane. Production will decrease 80% or more. Protect it with heaters or at least completely drain the housing during periods of extended sub zero temperatures.

Generally replace the membrane when its rejection rate (amount it reduces TDS by) is below 90%. This will pay you dividends in resin usage and fill times.

## **Batteries**

The quality of lead acid batteries varies dramatically. You will be using deep cycle gel leisure batteries that can cope with full discharge and recharging many times (noted by cycle volume). These are used in the caravan etc industries. These are different than the normal car or van engine batteries that are designed for a massive partial discharge and then a constant trickle charge until full. This type of battery will not last as long as the leisure type, even half as long. It will "sulphate up" when left discharged even for a short while. It is common for an operator to replace his leisure battery with a vehicle liquid battery as they are cheaper and he feels he's getting a bargain. Get the right type – it will let you down otherwise and even 1





day lost will be far more costly than several Halfords battery savings.

It's good practise to put the auxiliary battery in the back of the van on a 24 hour trickle charge over a weekend once or twice a month.

Expect a life of 12 months, but sometimes up to 2 years for a quality battery with a quality split charger feeding it and as soon as it shows signs of reduced performance, change it.

#### Pumps, Switches and Electrics



These are the cause of most failures and complaints. The quality and standard of the electrical installations is not of a professional auto-electrician standard from any of the suppliers. The more complex the electrical set up, the higher the chances of failures and when they do occur they are more difficult to solve. So be aware that you may need to visit the manufacturer's premises whenever problems arise.

You can opt for the simpler electrical arrangements that are a lot more likely to be repaired DIY as most issues are resolved by simply replacing components. It is more likely that a local auto-electrician will correct most issues with the simpler systems, as this is often the quickest way to get back on the road working.

The electrical wiring becomes a problem after a period of time due mainly to corrosion, then to physical damage from vibration and general trauma. This causes the most "tricky" problems to solve and sometimes the complete replacement of wiring is necessary. It's not an expensive job on most systems and vans and it's good housekeeping practise to do this every 3-5 years if you want to minimise costly downtime.

The digital switches should all be sealed. Water is a major cause of switch failure. The feed should be fused as well. Generally, switches last 12 months – 2 years but can fail within a few months due to the delicate nature of the electronics. This is an item you should have as a spare. You will lose 1 – 2 days minimum of work when the switch fails and there is no warning. One minute it works and the next you are on your way home.



Make sure you have set the pump cut off point correctly. It doesn't need to reach 100psi before

shut down. Use a pressure gauge (B&Q) to set it at 80psi or even 60psi. The switch will take less current and the pump will work less, both extending the life spans significantly, a little like driving your car sensibly, it gets you there just the same, but with lower expense. A spare pump and switch is a must to have ready for the inevitable failure. You have a spare wheel for a reason!

## The Poles

The poles are the most handled and used part of the entire range of equipment. They are taken out every clean and constantly suffer the most wear and tear and abuse. Expect pole damage. You can only reduce its occurrence. The owner operator will always have the lowest incidents compared to the hired hands. Working with poles needs care and they need the most attention of all the kit. Firstly, make sure the operators are using the correct pole for the job and of course they have had the training on best practise. As the levels of windows are lowered, a shorter pole should be used. A lot of accidents occur because a heavy, larger pole is used for lower work and fatigue has caused misjudgement. This also applies to the correctly matched gooseneck and brush head – give this some thought.

Change the brush heads more often than you think. A quality bristle in the right condition will give a better result and reduce effort markedly. The low relative cost is worth the quality finish you get more frequently.

Between brush head replacements, you should clean the bristles regularly. Oils and grease can build up surprisingly quickly and will not leave with pure water alone. This is especially the case if you have been cleaning none glass surfaces like cladding or signs etc. Warm soapy water will be adequate. But once you see the "eyelashing effect" starting, it is time to replace the brush head.

The pole hose that travels the length of the pole will be supplied in many different qualities. Most are not up to the job and need replacing within 6 months. They are often too stiff in the winter and too soft if warm water is used. Paying extra for a higher specification hose (ID 5 – 6mm) is a good headache reducer. It is still a cheap expense as the hose is only as long as the pole and will cost no more than  $\pounds1$  per foot.

The telescopic poles these days are made to quite close tolerances and the surface wear is a major issue. As soon as the outer layer of material, be it carbon or fibre glass, is abraided, the reduction in diameter and wall thickness starts. This is prematurely caused by grit and debris that forms a paste with water and steadily grinds down the tubes. Not only do the sections start to stick and drag when opened and closed, but they start to wear unevenly. Low spots appear and then a weakness exists. This is where it breaks prematurely. You dramatically reduce this effect by cleaning the tubes several times a week. Especially after heavy cleans where poles are laid on grass verges or concrete.

To clean, you extend the pole fully, separate if possible, and wipe down with a damp cloth. Let it dry and then polish with a dry rag and a silicone based or bees wax based polish i.e. Mr Sheen. Do not leave poles permanently wet for long periods of time as they do tend to absorb water when older and can swell a little causing stiffness when extending. The cleaning will extend clamp life dramatically too. Clamps are often softer than the tubes and wear at a faster rate. Even 1 – 2mm in diameter will prevent a clamp from holding a section and the whole pole is useless. The clamps also need regular attention. The tensioning should be done weekly. This needs to be judged – not too tight or too loose. Over tightening causes the cams to round off and reduce grip and also the operator will snap the levers often. Most of the lever action clamps in use will have steel bolts and nuts which corrode and cross thread. Changing these with levers annually at least will liven up a pole, even if the sections are showing a lot of wear and tear. Again, your spares pack should include a hand full of levers, bolts and nuts. Even a broken lever can stall a whole days work if that pole is critical to the job.

The various fittings and connectors used to join one piece of equipment to another will degrade quite rapidly. They are simply not designed to be dragged hundreds of yards along a pavement or car park. As soon as they become stiff or leak – change them. They are not worth the lost water. You should have a bunch in your spares pack. At the very least, WD40 them all regularly.

You can do yourself a favour by understanding that wear and tear is not warranty claimable. No supplier will replace a worn out item. They have no control over how much or just how you use something. Everything will wear down and you need to budget for a level of attrition within your tools. You will find the more durable brands and either choose them or opt for a super light weight version. But don't expect the same results in life expectancy.

## **Chapter Nine**

# It's not just about windows! How you can expand your enterprise with other services and approaches.

Whilst you may be looking at this business solely from a window cleaning point of view, don't think that is what you'll be limited to. Of course you can just be strictly an external WFP window cleaner and do extremely well, but a large amount start off with the same idea and end up doing something different. This is one of the most exciting aspects of the cleaning industry. It's huge! And one type of service leads nicely to another.

## Why?

This is because any building that needs windows cleaning has a dozen other requirements. So often the owners/managers have to go to several different suppliers to find a trader to help out with an issue. If you position yourself to capture some of these extra income streams, your business can get a rapid injection for growth. None of these other services are a secret. You will have heard, and maybe be skilled in all of them in one shape or another. You see, the old adage is true "it is much cheaper and easier to get new business from existing clients than to find a new client". It is also easier than you think for you to enter a new marketplace. So many times contractors have just "had a go" at a new task, found it easy and soon became quite competent. A lot take it further and attend a course, get qualifications or certificates or join an association and within days are quoting new business.

Whilst we are digressing from the WFP work, I think this is so important to at least be aware of, I will go a little deeper. As long as you are profitable and not just surviving – that's what counts. Your business model or strategy is where your success will be drawn from. Just hard work is not enough these days!

On the point of profit – if you can carry out an additional service while already onsite doing some WFP work, this is the best way to ratchet up your earnings. Let's look at a few obvious cleaning services that are all jobs in their own right, but can be used to augment your base services.

- Internal window cleaning Obvious I know, but many don't do it. It's less frequently
  required but so easy to do and there are even small poles and water pump systems
  to allow a poled approach for access issues.
- Carpet cleaning Equipment involved and some training. Pick your work wisely and it could help boost sales.
- Cladding cleaning The WFP equipment is very suitable for this often missed opportunity. A lot of buildings have only a few windows, but acres of cladding surface. This pays big money as it's quite intensive, but if you don't make this option available to a client, he may never ask you. Often, they rely on jet washes off platforms which immediately creates cost. You can be very attractively priced against this approach.
- Gutter cleaning/high level vacuuming This involves an investment but is a common add on. For around £1,500 you can have a system complete with camera and be wowing the customer with sights on his site he has never seen. Whilst gutters are quite seasonal (2 times per year) the internal high vacuuming is an all year round requirement in many commercial buildings. The pay back on domestic sites is rapid for gutter cleaning.
- Jet washing We all love blasting things! Yet a good jet washing system isn't a huge expense. They are made very well these days. Stonework, pavements, grafitti and cladding all benefit from a jet wash periodically. It's profitable work, so keep a keen eye out for it and ask.
- Chewing gum removal This is very lucrative. The equipment varies to do this job but I have found the highest return is with a back pack system. This is purely because you can access areas of difficulty with ease and perform the job very quickly. Watch out for the expensive refills for the packs. Shop around. I do know of some window

cleaners who have changed completely to gum removal work for their local councils which have proved huge jobs and what seems to be never ending as chewing gum gets discarded regularly.

• Other than doing these extra jobs yourself, you can still offer the services, but subcontract the work when you get it. It can be troublesome but with a good setup and partnership, this can give a good, new income stream!

There are many other services. Keep an open mind about this as you really don't know where it can lead to.

## Chapter Ten

#### Some business basics and effective tools for the beginner to consider to help manage the business and maintain control.

This chapter could be the basis for a book in itself, but I will keep it brief and mention a few things that I actually experienced and that will be quite pertinent to this particular industry.

So here's some pointers. If however, you are a seasoned business owner already, you will have addressed most of what is right for you from here, so forgive me.

- Decide on your brand and company image This is a very visual job. How you appear goes a long way to how people trust you. This is the usual list sign written van, literature, business cards, uniform, and website, among other things. Without this obvious selection you will not be able to consistently grow your business, so it's very much worth the effort.
- Your most valuable asset will be your customers and the business they give you. So when they connect with you and enquiries are made, you must do your best to make this as productive as possible. That's obvious you say! Yes, then why do so many businesses not even know who they quoted or who enquired or how any quotes they converted that month? You can't improve or grow if you don't know where you are right now. Some very basic KPI's (Key Performance Indicators) will prove so valuable to you as the months fly by. The simplest way to do this is to use a quote book. Yes, a simple wire bound, lined A4 book. Detail the date, customer, source, details, price and whether the quote was won or lost. If you enter every single quote you do, you will soon see what a useful resource this becomes. This is the strongest guarantee I'll give you in this book. Try it.
- Customer relationship and management tool (CRM) systems come in many shapes and forms but get a suitable one (i.e. CloudCrowd Systems Ltd) that can help you with sales and marketing. You can't live without it once you start. You will have many



Fig. 41

conversations with many people and a lot of stuff will happen to a lot of your contacts and you need to know about it always, and so does your new employee that starts next week. You can only do this by recording what happens religiously. A computer programme will do this for you. They are often called a "Customer Databa

- se" and even the most basic is a great help. You can categorise your contacts in different groups and market to them a specific message or offer. These systems will allow this and many other organised customer management tasks that will help you keep customers buying from you again and again.
- Money management is crucial whether you like it or not. You can get by just watching
  the bank balance and acting accordingly, but you won't know much else about your
  performance. Why wait until the end of the year to see if your accountant thinks you
  have made or lost money? You will not be in control of your business if you are
  simply reacting to the flow and ebb of your cash from day to day. Firstly, install a
  basic accounts package like Sage or any other. Pay a part time bookkeeper to
  organise and keep the accounts up to date on the system or you can learn yourself –

but probably best not. This will immediately save you money with any accountants you use to do the annual accounts. They need a system to work with otherwise they charge a lot to do it from receipts. Use the system to raise invoices, pay salaries and create purchase orders. This will load the information correctly. The final part of money management to address and the most important is a cash flow programme. Use Microsoft Excel to forecast when money comes in and goes out. You can practically run your business from this alone. It is not difficult. Your accountant or competent accounts employee can set this up for you. If you do nothing else, do this!

## <u>Summary</u>

You should by now be in a much better position to make decisions about your involvement in the WFP industry. I have taken the time to highlight the big pit falls and also expose the BS together with the plentiful opportunities in this way of working life. If you want to know more or have specific questions you would like answered, you can call our office and speak with me personally. You will find my contact details at www.brodexsystems.co.uk.

Thank you for reading this book and I would greatly value any feedback you have!