ARCHITECTS MEMO
by Colin Gooch, Resene Technical Director

No. 120: August 2015

power wash

It's just life I guess but things left outside simply get dirty - things like cars, windows, houses and roofs. Further, the damned things need washing either for aesthetics, maintenance, so my wife can see out of the windows or for preparation prior to painting.

Water is an excellent material to use for the cleaning process - but it just can't do it on its own (if it could, rain would prevent things getting dirty in the first place!) No! Water just needs a bit of extra power to do the job. In order to understand why, we need to look at the nature of dirt itself.

Typical dirt that accumulates on the outside of dwellings consists of fine mineral particles (typically clay), pollen and, depending on where one lives, diesel smuts.

The clay particles are very fine, about 2-25 microns, remembering that a micron is a thousandth part of a millimetre. These particles are small enough to lodge firmly in any pores within the surface, but they have additional means of adhesion. Clay particles are 'platey' in nature and the edges of the 'plate' carry electrical charges. These engage in a series of electrostatic interactions with various surfaces, which make most of them difficult to dislodge.

Pollens vary from about 8-100 microns. The smaller ones are well able to become lodged in pores, but a more important characteristic is that their surfaces are covered with waxes and proteins - both of which are good adhesives!

Diesel smuts are composed of ultra-fine carbon black particles caused by incomplete burning of the fuel dispersed in the unburnt 'heavy ends'. Oily materials 'plate out' on surfaces, are hydrophobic and are very difficult to remove. Diesel smuts can also 'plate out' on the basal planes of clay, increasing the difficulties of removal.

These surface contaminants provide a 'des res' for mould spores, which are opportunistic 'settlers'.

Water alone, even with the added chemicals that make our water safe for us to drink, can only remove the largest, most loosely held hydrophilic particles. Power can be added in the form of 'elbow grease' - old fashioned, character building and not very efficient. It may, however, result in a sense of self-righteousness and provide an impregnable reason for having a beer after such a day's work.

Power can be added in the form of heat. Hot water has more energy than cold and that energy can be used to dislodge, especially, mineral dirt. Further added heat can produce steam, which is an even better cleaner.

Power can also be added in the form of pressure and high pressure waterblasters are very effective means of cleaning surfaces.

However, all of the above tools have difficulty in removing greasy, oily or waxy soiling. For water to remove dirt it must compete with the dirt for the substrate surface - once the water gets to and 'wets out' the substrate surface, the dirt is automatically dislodged.

The three hydrophobic materials mentioned above are extremely difficult to dislodge with water alone. Imagine trying to do a sink full of greasy dishes in just cold water - impossible! Hot water is a lot easier as some of the grease would melt off and float to the top of the water (for subsequent re-contamination) but the remainder would have to be smeared off on the tea towel, still probably leaving a thin film behind.

Add a squirt of washing up liquid and the problems disappear. These cunning molecules, called amphiphiles, have a part that love grease and a part that loves water. A gang of them will approach a droplet of grease, surround it and dip their grease-loving 'tails' into it. This forms a structure a little like a dandelion seed head, the outer part of which is the water loving tails of the detergent safely carrying in the middle of the micelle the glob of grease. This is added chemical power.

Paint preparation cleaners contain material that makes water wetter, satisfying the charge needs of mineral dirt and floating the particles off. They also contain surfactants that can emulsify oils and water soluble solvents to soften up and loosen harder to deal with waxy soils.

No-one of any conscience wishes to add unnecessary chemicals into the environment but there is a case to say that the use of such cleaners is the most efficient 'power' to add to the water.

Environmental impact can be minimised through the use of biodegradable ingredients as can care during use, ensuring that none of the washings enter the stormwater system.

What's that sweetheart? My turn to do the dishes?! Again?! Where's the Sunlight?

In Australia:
Call 1800 738 383
visit www.resene.com.au
or email us at advice@resene.com.au

Resene
the paint the professionals use

In New Zealand:
Call 0800 RESENE (737 363)
visit www.resene.co.nz
or email us at advice@resene.co.nz

View more Architects memos on the Resene website, www.resene.com/archmemos