

## next to godliness

In Architects memo No 85 (Strewth! Was that really November 2006? It just seems like yesterday!) we talked about the increasing use of paints as bactericidal surfaces; especially in Japan, but increasingly in areas of America and Europe.

There are several strategies used to make paint films bactericidal, the simplest strategy being to incorporate a bactericide into the paint films which will concentrate at the paint-surface. On contact with a bacterium, the bactericide will (by molecular design) enter the cell wall and wreak its havoc.

The trick with this approach is to be able to select a bactericide that is lethal to bacteria but harmless to humans!

Colloidal Silver, the technology that Resene adopted, is a highly successful biocide with virtually no mammalian toxicity. There is some conjecture as to how the silver gets into the cell of the bacterium, but one possibility is that the bacterium actually does it to itself. It is known that bacteria search for essential minerals, such as iron, by going 'fishing' outside its cell. It protrudes molecular arms, called siderophones, outside its cell to grab atoms of iron. If it is fooled into transporting silver atoms into its cell, these atoms then give it the slow 'kiss of death'.

There has been, and continues to be, a lot of effort put into developing paint binders that are in themselves, bactericidal. As these binders are not soluble and are unable to enter cell walls,

they have to adopt other strategies. Typically, bactericidal polymer films look to accumulations of electrical charge on their surfaces to 'deal to' bacteria. One such exciting polymer became very close to commercialisation before being 'pulled' from the market.

The other exciting technology involves the use of nano-sized particles of anatase titanium dioxide which, under the irradiance of U.V. or near U.V. light, produces short-range free radicals. These free radicals blast everything organic, including bacteria, within range. This, in turn, demands special paint binders which are, in themselves, resistant to these very active radicals.

Bactericidal coatings have proved to be effective, and are increasing in popularity but, as stated in Memo 85 and re-emphasised here, they should be seen as a useful adjuvant to normal hygiene regimes. Typically, a number of the killed bacteria will remain on the surface of the bactericidal paint – eventually building up to the extent that they will form a barrier, preventing contact between new bacteria and the surface.

At this point the walls will need washing to remove this build up and to rejuvenate the paint surface. A sanitising cleaner is to be preferred; one that will not leave a bacteria-friendly residue.

The silver bactericide will, naturally, be depleted over time depending on the severity of the site and the number of washes it has. Re-coating will be required from time to time.