

Proteins bring sustainable paintwork protection

Ecological reason is increasingly shaping society and the economy. All the better when sustainable conduct brings additional economic benefits. Now, companies can take advantage of this opportunity when it comes to cleaning buses and locomotives. With its "Easy-to-Clean" concept, Reinwerk Solutions GmbH, in conjunction with Gelita AG, has developed new techniques for exterior cleaning. The advantages of methods based on innovative surfactants and functional proteins include less use of chemicals, guaranteed compliance with safety limits, easy removal of stubborn dirt - even graffiti - and a self-cleaning effect using rain. With "Easy-to-Clean", intervals between cleaning are longer, fleet life-cycle costs are reduced and the overall appearance of vehicles is optimized.

► Rail transport companies, as well as bus and commercial vehicle operators, are constantly seeking ways to optimize the exterior cleaning of their fleets, from the point of view of both operating costs and cleaning results. Ecological methods are thus becoming increasingly important. Even in the tendering process and subsequent transport contracts, the requirement is for holistic sustainable concepts, which also includes vehicle cleaning. Depending on the size of the fleet, costs can soon run into six figures [1].

CURRENT CLEANING: COSTLY AND COMPLEX

Vehicles are currently washed regularly in exterior cleaning facilities. Problematic defilement, like on door openers or graffiti, is cleaned off by hand. Depending on the intensity of their operational use, vehicles are also deep cleaned twice a year; a process that is both costly and time-consuming.

IMAGE 1: Clean as a result of self-cleaning: the roofs of NOB train carriages



To extend the length of time between cleaning, many operators apply a dirt-repellent permanent coating to the exterior surface of the vehicle. Nevertheless, experience shows that, with regular cleaning, this protective coating only has an average lifespan of three years, after which the desired effect noticeably reduces. A new protective coating can only be applied after a time-consuming and expensive pre-treatment.

SURFACTANTS AND PROTEINS WORKING TOGETHER

The "Easy-to-Clean" concept is based on a completely different operating principle. Reinwerk Solutions, together with Gelita AG, the world's market leader in collagen proteins, has developed an innovative and sustainable cleaning process: functional proteins, under the brand name of Novotec, which are also used in other sectors of industry, are combined with the latest environmentally friendly



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surfactants, not only to gently remove dirt, but also to leave behind a protective film on the exterior surface, that is wettable with water.

The protective film is applied during the cleaning process with LoClean cleaning agents, developed by Reinwerk Solutions. It forms with the first application, without interfering with existing washing technology. It has been proven to retain its full protective function for three months, even in demanding operating conditions. Every time LoClean products are used for cleaning, the protective film is renewed. The effectiveness of the patent-pending cleaning systems developed in conjunction with Gelita has been proven in field tests, both

IMAGE 2: Likewise cleaned just by rain: flexible corridor connection





IMAGE 3 and 4: Sparkling windows and paintwork: the protective film on ÖBB train carriages makes the vehicle's exterior look "like new"

at home and abroad. Due to their high affinity with surfaces, the functional Novotec proteins ensure the targeted elimination and removal of dirt. A second protein then forms a temporary protective coating with hydrophilic, that is to say water-binding, properties. The protective coating sits on top of the paintwork structure, filling the tiniest of surface irregularities, thus providing a smooth finish.

FINE FILM OF WATER, TOUGH PROTECTION

The protein layer induces the formation of a microscopically thin film of water, which withstands the effects of both weather and intense sunlight. The protective film has an astonishing effect. The initial visual appearance after cleaning is that the vehicle is gleaming and the treated surfaces look like they have been polished. There are no water stains or stubborn deposits of dirt. The protein film ensures that dirt particles do not even reach the surface of the paintwork; thus, the paintwork is neither attacked nor damaged. If dirt becomes visible, it only adheres to the aqueous protective film. It can easily be cleaned off with a sponge or a cloth or in the brush cleaning facility. "Easy to clean" – true to its name! Dirt, particularly on vehicle roofs, often disappears when the vehicle travels through rain. If the train or bus is caught in a heavy downpour, the rain itself washes off the particles of dirt "swimming" on the protective film. Regular cleaning with LoClean products enables operating companies to completely dispense with the need for repeated and costly deep cleaning with aggressive chemicals. Nor is there any need for expensive permanent coatings, as the hydrophilic protection is renewed with every LoClean standard wash.

EFFECTIVE AGAINST GRAFFITI

The protective coating also ensures that graffiti removal is significantly easier and more sustainable. The unique effect of "Easy-to-Clean" is that it is resistant to solvents contained in the spray paint. Thus, the protective film prevents the graffiti from getting through to the painted surface of the vehicle in the first place. Graffiti can therefore be removed without damaging the painted surface and residual marks following removal can be avoided.

GENTLE AND HIGHLY CONCENTRATED

LoClean products with this innovative cleaning technology meet all environmental standards. They have been approved by leading paint manufacturers and operators. As the product does not contain any aggressive substances registered as hazardous by the operator, there are no issues regarding discharge standards. In any case, the products used are heavily diluted. For intensive cleaning, the neutral cleaner can be used in the brush cleaning facility in the ratio 1: 20 to 1: 30. For routine cleaning, the ratio is 1: 80 to 1: 240. When it comes to rinsing, a protectant is used with

dilution of 1: 20,000 to 1: 25,000. This reduces procurement and storage costs.

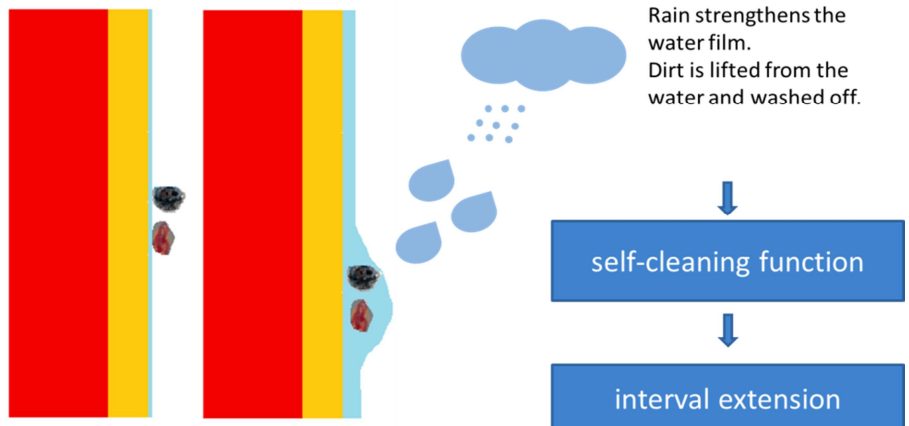
THE BENEFITS AT A GLANCE

There are various ways in which this solution satisfies operators' requirements for cleaning concepts that are as ecologically attractive as they are economical:

- Regular cleaning with "Easy-to-Clean" products keeps vehicle paintwork looking like new. Cleaned surfaces gleam as though polished and colors appear brighter.
- Older vehicles can easily be adapted to the innovative concept
- The length of time between cleaning is considerably extended, thanks to the application of a protective film with a self-cleaning effect. This is both sustainable and cost-effective.
- The protective film can be applied with all forms of wet cleaning in exterior cleaning systems and by means of manual dry cleaning. ◀

Literature

[1] Becker, Hermann: Nachhaltig Kosten senken bei der Außenreinigung von Bahnen und Bussen [Sustainable cost reduction in the exterior cleaning of trains and buses], ETR 5/15, pp. 67f.



Q&A with Wolfgang Rudolph

Back in 2009, NOB was one of the first companies to use the Easy-to-Clean concept described here. How big is your fleet of vehicles?

We have 90 rail carriages, 3 Lint 54 diesel multiple units and 15 "Traxx" DB 245 series diesel locomotives.

Is protein-based vehicle cleaning really easy, or at least easier?

Yes, it is actually easier. In our salty North Sea air, we have been able to extend the period between cleaning from just two or three days to 14 days. Before, we could often only get vehicles clean in winter by manual washing. Those days are over. Even coarse dirt can be removed easily. Dirty windows are also practically a thing of the past.

What is your long-term experience regarding the condition of vehicle surfaces?

Over the years, the vehicles have continued to look amazingly good. The cleaning agent's protective film gives the paintwork a glossy shine.

Which self-cleaning effects have you particularly noticed?

Rain and snow simply wash the particles of dirt away from vehicle roofs and gangway connections, with no need for brushes.

What experiences have you had with typical "technical" defilement in operation, such as graffiti or insects?

In the warmer weather, our train drivers use the relevant cleaning agent for insects twice a day and no longer have any problems with them. As I said before, all other dirt, whether organic or inorganic, is easy to remove.

Has the Easy-to-Clean concept meant you have had to make changes to your cleaning procedures?

In coordination with the manufacturer and Reinwerk Solutions, we have adjusted our washing facility here in Husum to accommodate the new cleaning procedure and have been able to automate it such that vehicle cleaning is now a one-man operation, done by the shunter. We have installed a presoak arch to reach the surfaces that the brushes cannot reach. We have agreed a maintenance contract with Reinwerk, which ensures that the system is constantly available to us.

How would you rate the cleaning concept in economic terms?

Now, I would say it is good. We have invested in order to optimize our system. Nevertheless, the principle of easy cleaning and extending the period between cleaning translates into a significant reduction of staff.



Wolfgang Rudolph, Head of Cleaning at Nord-Ostsee-Bahn (NOB), Husum

Fleets maintained with dry cleaning

► The "Easy-to-Clean" concept described above enables transport companies to augment the cleaning results achieved in wet cleaning in wash tunnels with dry cleaning by hand. The innovative process is particularly recommended for surfaces that brush systems cannot reach. Intermittent spot cleans, for example on doors or electric door openers, can also be carried out between wet cleans to improve the vehicle's appearance. Dry cleaning can be done anywhere; it needs no infrastructure or waste management.

The vehicle cleaning specialist, Reinwerk Solutions, has extended its range of LoClean products to include cleaners for

manual dry cleaning, also based on functional Novotec proteins. In fact, dry cleaning, provides better results than wet cleaning done by machine: the visual and tactile control of the user at

work is ultimately better than any machine.

There are currently two pH-neutral application solutions available for various types of dirt. In the first step, the cleaner is rubbed into



the surface of the vehicle using a cleaning pad. Within seconds, the surfactants in the cleaning solution penetrate the dirt, which the functional proteins then eliminate from the surface. The dirt floats ("swims") on the aqueous protein layer that forms and is then removed with an absorbent microfiber cloth. A finisher is then applied to the surface finish. The results of cleaning are that the surface is smooth and has a high shine.

Dry cleaning does not give rise to any form of residue that needs to be mopped up, dealt with or treated. The fact that it is independent of any washing system infrastructure means that dry cleaning can also be done during breaks in operation and regular service life. A non-federal railway in southern Germany is planning to completely dispense with time-consuming and labor-intensive trips to wash facilities. According to their experiences, a 27 meter, single-decker railway carriage can be positively gleaming in five man-hours. The materials required are minimal: operator solutions and

resources cost less than €60. Despite high staff numbers, when it comes to cost comparisons, dry cleaning competes

favorably with mechanical wash tunnels, when taking account of the cost of trips taken to the exterior cleaning facility. ◀

