25.04.2007 08:32

Changing windows made easy

Press release

Der Nahverkehr 04/2007

Experts in the field of public transportation may have grown weary when it comes to vandalism. Much, if not everything, seems to have been said about this subject. Yet, the growing tendency towards damage caused by vandalism again and again forces a discussion about this tedious subject. Besides the graffiti, the scratching and breaking of the window panes have an impact on the appearance of the vehicles and lead to the loss of millions of Euros each year.

Due to broken or scratched window panes, the windows have to be replaced sooner or later. The growing tendency towards vandalism in the recent years is best shown by the following figures:

- BVG Berlin: 3,9 Mio Euros ("Berliner Morgenpost" 10.01.2004)
- Duisburg Bus & Tram: "all windows scratched" ("Rheinische Post" 03.12.2004)
- Leipziger Verkehrbetriebe: 3,5 Mio Euros ("90 % all of the glass panes scratched" - Betreiber 04/2004
- VGF Frankfurt/Main: 1,5 Mio Euros

It has been calculated that presently the costs arising from damage caused by vandalism are rising by 11 percent annually.

How can companies counter these developments?

Sanding or polishing of the glass and window panes is a possibility, however, this causes a lot of effort and work and is completely impossible in the case of security glass. Therefore, the recent times have seen a boom in scratch-resistant foil, which is supposed to prevent the scratching of window panes - the service life and effectivity of these foils still is debatable. Furthermore, the cost is enormous - including installation, the price is approximately 40 Euros per square meter.

Many public transportation services still favor the "traditional method" of cutting the window pane and subsequently wet bonding a new one in place. Wet bonding requires long shop times and creates idle and down time for the public transportation services. Some prestigious public transportation services have precisely documented their experiences:

For example the HAMBURGER HOCHBAHN specifies the cost for the replacement of bonded windshields in subway vehicles to amount to 7 500 Euros (6 000 Euros of which are loss of wages or down time respectively, caused by an idle time of 2 days), material costs are merely 1 500 Euros. (Source: Hochbahn)

The cost for the exchange of ESG side windows is specified by the EVAG Essen to amount to a total of 1 000 Euros (900 Euros of which are loss of wages or down time respectively caused by an idle time of 1 - 2 days), material costs

are merely 100 Euros.

Prior to the introduction of the 2-component window bonding systems, almost all window panes in the field of public transportation were "rubber-mounted". A rubber frame made from highly flexible and weatherproof EPDM (Ethylene-Propylene-Diene-Monomere Rubber) with corner-shaped parts was used to reliably and effectively seal the windows.

Overlaying, massive rubber bulges fell out of favor with the introduction of the smooth, streamlined vehicles created by designers. The "tolerance-compensating spraying mixtures" were the solution to this problem.

Rubber seal frames flush-mounted on the vehicle

Meanwhile, there are appealing rubber seal frame systems, available from companies such as Hübner, which can be flush-mounted to the vehicle body. These systems do not require the cutting and subsequent bonding of windows during an exchange and therefore permit much shorter shop times and drastically reduced idle times of the vehicles. With the application of such rubber seal frame systems, the cost situation changes immensely since the down times, which cause most of the costs, are drastically reduced.

An example to illustrate this: The cost for an exchange of an ESG side window is a mere 120 Euros (60 Euros labor cost and 60 Euros material cost). For windshields, the cost for an exchange of a quick-changeable window system is approximately 2 000 Euros; 500 Euros labor cost and 1 500 Euros material cost. The exchange of systems with rubber seal frame takes only two hours.

Meanwhile, the majority of public transportation services in German-speaking countries rely on the technology of quick-changeable window systems and define these in their specifications for new vehicles and the refurbishment measures for older trams as a requirement.

A nice side effect is that the ventilation and the exchange of condensate of the groove between vehicle frame and window pane are ensured. This is achieved by the circumferential hollow chamber which is integrated in the rubber and causes the controlled exchange of moisture to be ensured. This is crucial for the corrosion resistance of the vehicle. (Source: HÜBNER GmbH, Kassel)

This new method of changing windows provides a quick and easy contribution to cost reduction during maintenance with an immediate effect.

Dipl.-Ing. Ralf Waibel (Graduate in Civil Engineering)
HÜBNER GmbH, Kassel