MAINTENANCE OR INSPECTION PLAN FOR BONDED FAÇADE CLADDING

In general, we recommend drafting a maintenance and inspection plan for every façade based on an overall evaluation of the façade structure.
The overall evaluation of the façade structure will determine any failure mechanisms which may play a role in the various components over time. Here, particular attention should be given to potential process faults due to design and/or application errors.

The maintenance and inspection plan should describe the method for investigating whether the failure mechanisms in question have occurred. It should also detail the required inspection frequency and the specific points to be examined during the inspection.
Experience has shown that if there is no immediate reason to perform upkeep on the façade envelope, then it is generally prudent to conduct an overall evaluation at least twice during the service life of the façade cladding. The first evaluation should be performed when the façade envelope is around 1 year old. In practice, the majority of incidents of damage to façade cladding occur within the first few years of delivery, as a result of shortcomings during the design and/or execution phase. A second inspection should be conducted when the façade envelope is at least around 20 to 30 years old, in order to gain insight into the façade envelope's durability. One exception to the above is façade systems cladding a wooden structure, whose durability may come into question after as little as 5 to 15 years.

In cases of façade cladding envelope, this frequency can be increased. Here, you should consider an initial check one year after delivery and a second one two years after delivery. This will provide timely detection or prevention of incidents due to shortcomings during the design and/or execution phase.
After these two years, it is safe to assume that there will be no more incidents due to shortcomings from design errors and/or execution. Therefore, attention should be shifted to subsequent inspections focusing on durability and ageing in both the structure and the components in the façade structure. Here, we recommend conducting an inspection once every five years, starting immediately after delivery.

You can use visual inspections to 'monitor' the façade cladding. This can be done, for instance, by inspecting the most critical sides of the building's façade, either visually or with endoscopy. In cases of noticeable anomalies, you can proceed with a destructive test if necessary.
Destructive testing with the possibility of repair can be performed by using a cutting wire to remove one or more façade panels and visually checking whether any detectable changes have occurred. In this inspection, check not only the bonding adhesion, but also the structure, and assess the façade panel for discoloration, deformities, corrosion, cracks in the glue and for cracking/detachment between the glue and the mounted substrates.

Checklist for first visual inspection:

1. Are there any loose parts on one or more façade panels? Check the corners of the façade panels in particular.
2. Are there any major deformities in the façade panel, such as concave or convex warping between the different studs in the underlying structure?
3. Is there any cracking or breakage in the façade panel?
4. In the morning, is the underlying structure visible through the façade panel due to condensation (which may be an indication of inadequate ventilation)?
5. Are there adequate ventilation openings in the façade (large amounts of moisture behind the façade panels is an indication of inadequate or blocked ventilation)?

If any of the anomalies mentioned above is detected, by means of endoscopy or destructive testing, then further study is necessary in order to determine whether there may be:

1. Blocked ventilation (due to bulging insulation or vapor barrier)
2. Glue strips applied incorrectly or in the wrong location.
3. Deformations in the façade panel.
4. Glue layers of inadequate thickness.
5. Cracking in the glue strip.
6. Detachment of the glue on the stud frame and/or the façade panel.
7. Corrosion or wood rot on the underlying structure.
8. Anomalies in temperature and humidity.

Another option is to check the strength of the glue by applying a uniformly distributed load on a mounted façade panel. For this check, use a vacuum system, made up of two rows of three vacuums each with a diameter of approx. 300 mm connected in a uniformly distributed manner at the location of the underlying structure. Determine the applicable load based on the location, building height, wind shape factor and material factor in accordance with (local) Building Act.

Afterwards, appropriate measures can be taken according to the nature and severity of any findings.

One of the main causes (but not the main cause) of glue failure is penetration of moisture into the façade panel and/or underlying structure. It cannot be emphasized enough that adequate ventilation is necessary for durability of the structure. This ventilation will ensure that the underlying structure is able to dry out, which can prevent wood rot/corrosion.
It also prevents large differences in temperature between the front and back of the façade panels. This, in turn, limits expansion and contraction of the underlying structure and the façade panels.

In short, the following steps should be followed in the inspection:

1. Gather all available information on the design of the façade cladding, on the implementation of the façade cladding and on any maintenance work performed.

2. Based on the information available, examine which failure mechanisms could play a role in the façade cladding in question. This examination must be carried out for each individual component of the façade envelope, i.e. both for façade elements, the underlying structure and their connections.
3. Visually inspect the façade cladding. During this inspection, all visible shortcomings must be recorded. It is also necessary to check very carefully whether or not any potential failure mechanisms established in step 2 have actually occurred.
4. Analyze the information from the first three steps. This analysis should demonstrate whether enough information is available for a reliable assessment of the overall façade cladding. If there is, then proceed to step 7; if not, go to step 5.
5. Conduct an additional detailed examination on the façade envelope. This examination must go beyond a mere visual inspection and will usually amount to (semi)destructive testing.
6. Analyze the additional information from step 5.
7. Give a final assessment of the façade envelope.
8. Give any relevant recommendations for maintenance and repairs.

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