11. Maintenance and Repairs

11.1. Damages and Defects of Sandwich Panels

11.1.1. Changes in Surface Coating Colour

Over years air pollution, UV radiance, solar radiation and fluctuations of the outdoor air temperature can cause substantial changes in the coating of panel steel facings.

In separate cases on walls facing south the temperature of panel surfaces can reach +80°C (dark colour coating) and +65°C (light colour coating). The original coating can remain intact without significant deterioration for 25 – 40 years, depending on the colour of the coating, location of the building and weather conditions. The sandwich panel surfaces with dark coating usually are subject to higher temperature fluctuation stress than the light colour ones, thus their service life is shorter than for light colours.

11.1.2. Scratches, Cracks and Dents

Scratches, cracks and dents in the coating decrease the service life of the panel. Impurities and humidity can accumulate in the scratched and dented surface coating, thus facilitating the development of corrosion. Therefore surface damages (scratches, cracks, dents) should always be repaired in due time. If the repair is made immediately, the damaged area often is only a scratch of some millimetres, which makes the repair quick and easy. After a longer period of time it may be more difficult to fix the same damage. It may also be difficult to make the damage unnoticeable, as the colour of the touch-up paint may not completely match the old coating, which has changed due to weather conditions.

11.2. Annual Inspection of Sandwich Panels

Annual inspections to check the condition of the panels should be performed for all sandwich panel buildings. The results of inspection and actions taken should be registered in a special journal. Found panel defects and damages should be repaired immediately. The annual inspection and following actions should be carried out in accordance with table 11.1.

Annual arrangements of panel inspection.

Table 11.1

No.	Object to be inspected	Action to be taken
1	Dirt and dust on painted surfaces of panels	Wash surfaces
2	Cracks, discoloured areas in the surface	a) evaluate damages and defects b) if necessary, touch-up paint
3	Scratches and dents in the surface	Touch-up paint scratched areas, repair dents
4	Corrosion of cut edges of cover plates	a) check the condition of cut edges b) if the ends are rusted, remove the rust c) paint the area
5	Cover plate tightness	a) check if the cover plates are tight against the panel b) if there is a gap, tighten it by adding cover plate screws
6	Screws 6.1. Panel fixing screws 6.2. Cover plate fixing screws	 a) pull out one screw and check its condition b) if there is no rust, replace it with a new screw of a larger ∅ a) check the grip of the screws b) if loose and not possible to tighten, replace with a screw of a larger ∅

11.3. Recommendations for Sandwich Panel Cleaning

High-pressure water pumps with spray pressure of up to 4 MPa can be used for washing panel surfaces. When using high-pressure water pumps, it is important to apply the water spray from at least 50 cm distance and at a downwards angle. At panel joints, special care should be taken to avoid water penetrating the joints. Water should not be sprayed directly into the joints. Difficult stains can be removed using petroleum spirit.

The pH value of the used detergent should always be between pH 5 – 10, not containing solvents. The surface should always be rinsed with clean water after using a detergent.

FoodSafe (FS) surfaces of panels used in food processing industry, e.g. processing plants, storehouses, should be washed using detergents with pH value of 5 – 8 not containing solvents.

11.4. Repainting and Touch-up Painting of Surface Coating

11.4.1. Repainting of Surface Coating

Panel surfaces with polyester (PE) coating must be repainted after 15 – 20 years, with polyvinylidine fluoride (PVDF) coating – after 20 -30 years. Repeated repainting should be done after 10 – 25 years. With regular and correct maintenance (including repainting) the service life of panels can reach 50 years. Acrylic paint or acrylic latex is used for repainting PE and PVDF surface coatings. Some preparatory work should be done before the painting of surface:

- clean the surface as described in point 11.3 and let it dry properly;
- strip off peeling parts of the colour and grind off visible rust using abrasive paper;
- fill the dents;
- apply primer to cleaned surfaces.

11.4.2. Touch-up Painting

Small damages, for example scratches, are painted using a thin paintbrush. More extensive scratches including surrounding areas are first roughened using smooth abrasive paper, sand blast or metal brush. If the defect reaches only to the primer coat, one paint layer is sufficient. However, if the scratch reaches deeper (zinc layer is also damaged), it is recommended to paint the surface a second time after the first layer has fully dried. Paint sprays are used for painting larger areas. Touch-up paint is applied only to damaged areas, thus ensuring minimal colour contrast with the rest of surface. Before painting always check the tone of the paint on a small test area.

If rust has appeared on a damaged area, it should be roughened using smooth abrasive paper, cleaned from impurities, prime coated with anti-corrosion paint for metal surfaces and then touch-up painted.

Acrylic touch-up paint is used for PE and PVDF surfaces.

Damages in FS surface are treated in the same way as PE or PVDF surface damages, using FS touch-up paint which can be ordered from panel producer.

11.4.3. Additional Information

Extreme environmental conditions can damage even high-quality coatings. Panels should not be used in conditions with inadequate temperature gradients. If panels are located in places favourable for development of corrosion (increased humidity), two layers of touch-up paint should be applied to cuts of panel parts during or immediately after installation.

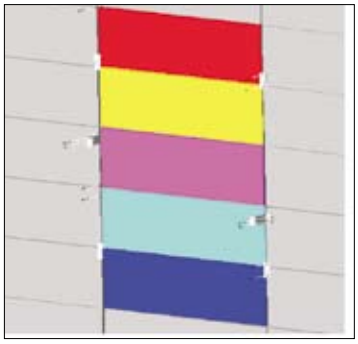
11.5. Instructions for Change of Horizontally Installed Wall Sandwich Panels

Sometimes the inspection reveals significant panel damage (extreme deflection, deformation of steel facings, large surface damages, etc.) lowering the load carrying capacity of the structure, and making it necessary to change the damaged panel with a new one.

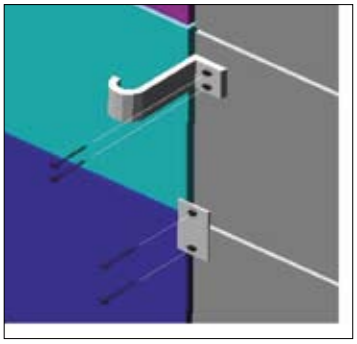
Procedure of changing a damaged horizontal wall panel:

1. Remove the cover plates covering panels A, B, C, D, E (panel C is damaged).
2. Add extra fixing screws to panel A and E.
3. Fix panels A and B to each other using steel strips (see pic.11.3), which are fastened so that the screw holes are covered by cover plates afterwards. Maximal allowed load per screw is 25 kg.
4. Remove the fixing screws in panel B. Now the panel is suspended in the steel strips.
5. Fix panels D and E together in the same way as panels A and B in point 3.
6. Mount safety profiles to panel D (see pic.11.3). Length of the profile = panel thickness + 15 cm. Remove the fixing screws from panel D.
7. Remove the upper fixing screws from panel C and pull out panel C. Mount LiftAid or similar lifting equipment to the panel and lift the damaged panel out.
8. Mount LiftAid or similar lifting equipment to the new panel. Add sealing compound to the joint of panel D. Mount the new panel into the joint of outwards bent panel D. Take off the LiftAid. Apply sealing compound to the joint of new panel.
9. Create a joint of panels B and C (new) by mounting the inside joint of panel B into the inside joint of panel C.
10. Press the panels against frame and check that the joints are properly together (panel is tightly pressed to the frame; sealant is applied to the whole length).
11. Fix the panels to frames with new fixing screws. Remove all auxiliary tools (steel strips, safety profiles).
12. Remount the cover plates.

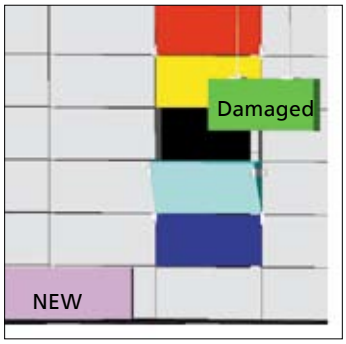
Pic.11.1



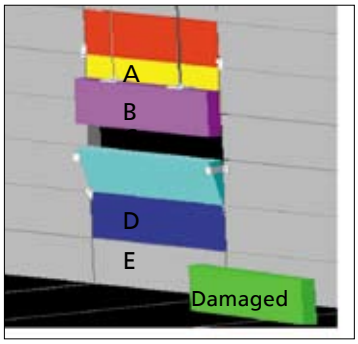
Pic.11.2



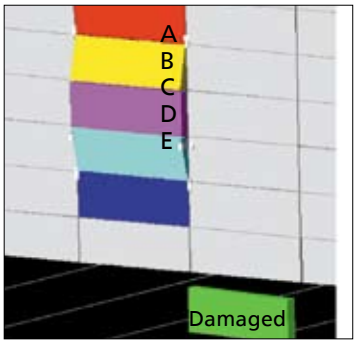
Pic.11.3



Pic.11.4



Pic.11.5



Pic.11.6