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Reuse guide for Ruukki Sandwich panels

- **General**
  Service life of Ruukki Sandwich panels is 50...60 years in normal conditions, if installed, inspected, and maintained according to Ruukki guidance. In many cases, the building lifetime can be considerable shorter and thus reuse of sandwich panels is reasonable solution instead of recycling of materials. Panel dismantling and reinstalling may also be actual in building extensions and modifications.

- **Planning of reuse project**
  Reuse project needs careful planning including following phases:

  - Collecting documentation of the original construction including façade drawings, panel installation drawings, and information on exact panel type, dimensions, and CE-mark
  - Checking conformity of the reuse-building product in new building
  - Visual inspection of panel surfaces from inside and outside of the building to evaluate need for maintenance. Inspection of vertical seam areas
  - Planning of dismantling process, possible maintenance, and storage of the panels before reuse
  - Planning of possible acceptance tests if needed
  - Re-design of panels in new location
  - Planning of reinstalling process

- **Collecting documentation & building product conformity**
  All drawings and documents on existing building façade construction should be collected. For sandwich panels following information is helpful:

  - DoP (CE-marking), if produced after 2013
  - Order confirmation (Panel type, panel thickness, sheeting thickness and coating type)
  - Panel positioning drawing or model

  Reused building product conformity is regulated at EU member state level, and valid regulations should be checked from local building acts. Normally, build site specific approval is need for the conformity of the reused building product.

  See proposals and instructions for tests needed for checking product conformity from PROGRESS-research report pp. 80-83.

- **Panel inspection**
  Panel surfaces shall be inspected visually from inside and outside of the building. Special attention should be paid on panel coating variations if used in different conditions in the building. Also different façade orientations (south, north) may have different influence especially on glossy of the coatings. These variations should be considered when designing new locations of the reused panels.

  Few vertical seam flashings and seam tapes should be opened to check materials used in the vertical seam (mineral wool, polyurethane foam...) to help design of dismantling process. Also, connection and connector types will be checked. Panel ends should not have considerable buckling around the connector. Insulation shall be checked visually, and also taken some pieces from few centimeter depths to see any moisture problems occurred. Moisture can also be measured with RH% meters from insulation layer. Absolute moisture level less than 12 g/m3 is recommended. Coatings on panel edges will be inspected if any rust is visible that need maintenance.

- **Panel dismantling**
  In panel dismantling, same main principles, equipment and safety instruction should be used as in panel installation (see Ruukki panel installation manual). Proper equipment, safety measures and skilled labour are essential to avoid any damage to the panels during dismantling.

  All panel flashings that prevent panel dismantling, shall be removed carefully, and avoiding scratching panel surfaces. Vertical tapes will be cut away along the panel end from the screw locations. Any elastic sealings or PU-foams that are connecting panels to each other's or adjacent structures should be removed or cut before dismantling. All flashings are recycled as metal waste if not usable for reuse. Mineral wool and sealing waste will be collected as mixed waste unless separate waste collection available.

  Panel lifting device is installed and panel screws are opened carefully. Sandwich panels are lifted carefully on the wooden pallets with length depending on panel length. A thin cardboard pieces shall be installed between panels to avoid scratching panel surfaces. Panel stacks shall be protected from rain with appropriate tarpaulins.
  Panel manufacturing information is visible on the upper joint area. This information is compared to design information and possible deviations should be taken into account. Panels are marked to identify their original positions.

- **Panel storing and refurbishment**
  Panels should be stored and maintained according to principles given in Sandwich Panel Installation Instructions.

  If panel needs aesthetical refurbishment, this should be done indoor conditions. All tapes and sealings shall be removed from the panel surfaces using tools and chemicals that are not damaging panel surfaces. Possible groove sealing may be left if undamaged. If there is no groove sealing at all, new sealing should be installed before panel installation. Panel coating should be cleaned and painted according to maintenance program and painting is recommended at least to outer skin if panel is more than 10 years old. Panel can be cut to shorter if needed. In the case of cutting, it's recommended to make cuttings to both ends to get rid of panel and flashing screw holes and possible small damages in the panel ends. In the case screw holes will stay in panels, they should be sealed in reuse. See above mentioned source for building product conformity (PROGRESS).

- **Design and installation for new location**
  Panel structure can be designed to new location with Traypan-program (https://designtools.ruukki.com/).
  It's recommended to use maximum utilization rate of 80% in panel and connection ultimate limit state design, to cover small deviations in panel structure during dismantling process.

  In panel installation, normal Ruukki Panel Installation Instructions are followed. Panel fixing screws should be located preferable 100 mm and at least 50 mm away from the old screw holes to guarantee structural integrity and stability.

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