

## Formatting HDF panels with veneer overhang

**Trimming unprocessed panels for engineered wood flooring (EWF) in a most exceptional way — that was the task assigned to HOMAG Group Engineering by one of the largest manufacturers of floor coverings in North America.**

### **The special feature:**

EWF is found almost exclusively on the North American market. This manufacturer's EWF consists of three layers: a 6 mm thick HDF core layer, a top layer made from 1.8 mm peeled veneer (oak, hickory, maple or walnut), and a back layer of 1.8 mm peeled veneer. The finished floor planks have a tongue and groove all around or a click profile.

Because of the different standard formats used for peeled veneer and HDF panels, the unprocessed panels (1510 x 2460 mm) have a large veneer overhang of up to 150 mm. The panels also exhibit significant curving as a result of the hot pressing process. Before the unprocessed panel can be processed further, the veneer overhang must be removed as it would otherwise cause malfunctions during the subsequent stages of processing. However, as little as possible of the HDF core layer should be removed as it is the most expensive part of the panel.

### **The challenge:**

Up to now, the edge of the core layer was traced manually and marked on the top layer using a neon-colored chalk. The panel was manually positioned on a circular saw using the markings and then trimmed. However, as marking and aligning the panels manually is a rather imprecise method, it was often the case that too much of the valuable HDF core layer was trimmed. The manufacturer therefore decided to collaborate with HOMAG Group Engineering to solve this problem.

### **Loading and longitudinal processing:**

The saw line, which consists of a double-end tenoner and a cross cut saw, is loaded by a robot. The robot places the panels on a roller conveyor. The panels are then fed in further and approximately aligned on the inclined roller conveyor, which has a fixed stop, in front of the FPL 620 double-end tenoner.

With this machine the longitudinal sides of the unprocessed panels are trimmed. The FPL 620 has a special infeed with a top pressure unit that can be lowered. The unit has rollers and is divided into two sections.

Section 1 is fitted with powered rollers. A servo motor lowers the section onto the unprocessed panel that is entering the tenoner. This section slowly presses the panel to straighten it so that it can run safely under section 2. This second section is positioned just above the panel that is being fed in and, after alignment, is lowered to ensure that the panel lies flat on the chain track.

The panel is aligned at two points with very thin blade guides on the middle layer. The task of these guides is to "thread through" between the overhanging and bent veneers of the top and back layer while the panel is being pressed by the holding-down rollers. This is the only way to ensure that the two guides have direct contact with the core layer and there are no strips of veneer between them and the core layer; this would prevent precise alignment of the panel and the part produced would be a reject. Using axes powered by a servo motor, the guides push the panel into a defined position. With this alignment the complete veneer overhang is removed by only one chipper on each side in the double-end tenoner.

This is possible firstly by the specially designed extraction hoods, which ensure that the wavy peeled veneer overhangs run straight into the chipper. Secondly, the chipping tool is designed for the maximum veneer overhang of 100 mm per side and trims the overhanging peeled veneer completely. Therefore, there are no left-over strips produced that could block the suction device. As a result of the precise alignment of the panel, a maximum of 1 mm per side of the HDF core layer is trimmed.

### **The angular transfer:**

The roller track after the longitudinal trimming and the angular transfer is fully fitted with holding-down rollers to enable safe transport of the tensioned panels. No stop fence can be used during the transition from longitudinal to cross transport as the veneer overhang can vary greatly, which would make a precise alignment of the panel before cross processing impossible. Furthermore, moving the panel against a mechanical stop damages the veneer overhangs. Any veneer strips that break off then remain in the angular transfer and can cause malfunctions. Instead, sensors are used during this transition.

The sensors are located in two rows above the panel that is being fed in. The first sensor detects the front edge of the panel or the veneer overhang and restricts the feed of the transport roller conveyor. As soon as the second sensor detects the front edge, the feed is stopped and the panel comes to a standstill without slipping.

The panel is transferred to the crosswise direction by two consecutive transport chains with cams that ensure that the cross cut saw is loaded cyclically.

### **Camera alignment while throughfeed:**

As the veneer overhang can vary greatly, the panel can only be aligned in the angular transfer within a tolerance range of 160 mm.

To ensure that the transverse side can still be trimmed precisely in the FSQ 380 cross cut saw, HOMAG uses state-of-the-art camera technology.

As soon as the panel has been fixed in position by the cam chain of the cross cut saw and the top roll pressure unit, two cameras detect the position of the vertical rear edges of the HDF core layer and pass this information on to the control system. The feed does not have to be stopped for this positioning process, which is accurate to +0.8 mm. The measurement is taken while throughfeed at a feed speed of 30 m/min, ensuring that the system attains the greatest possible levels of productivity.

For optimal process reliability, the camera system is designed redundantly, meaning that under normal circumstances, primarily the measured values of the right-hand camera are used. If the right-hand camera cannot detect the rear edge of the core layer, the measurement from the left-hand camera is used. If the left-hand camera also reports an error to the control system, the feed is stopped.

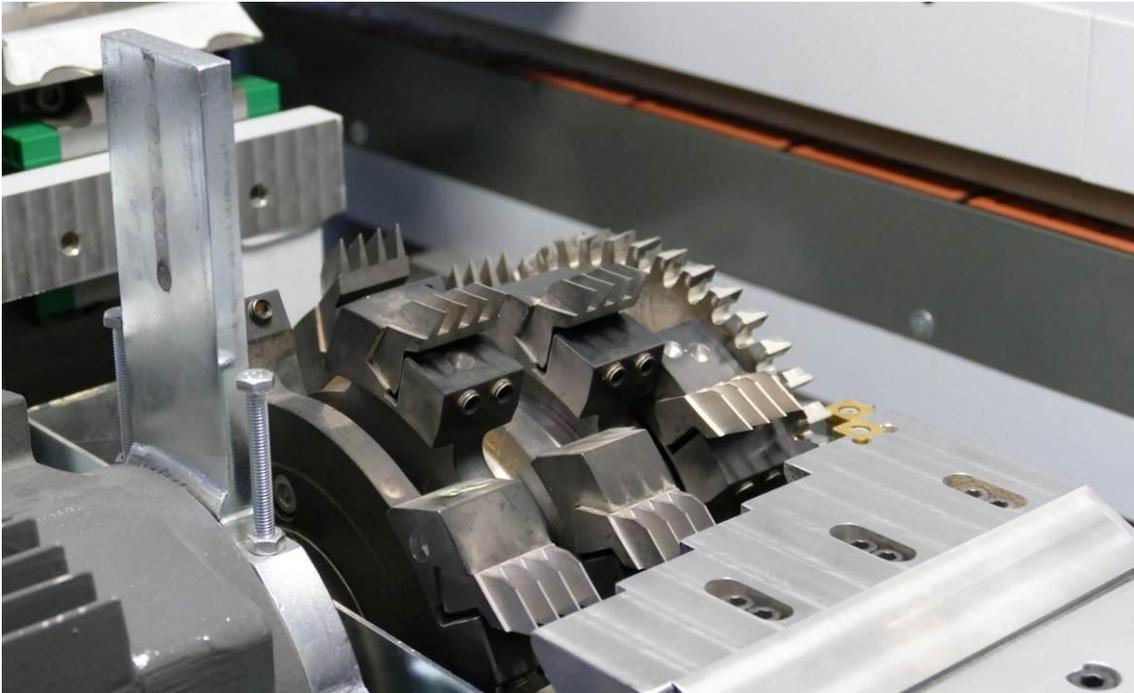
In this case, the operator can select the position of the rear edge with the mouse on the operator terminal using the photo displayed. The selected position is then passed on to the control system as normal and the processing of the panel continues.

This prevents the operator having to carry out an expensive and time-consuming error elimination process involving running the machine to empty, and avoids the need to post-process erroneous parts.

The chipping and sawing units of the FSQ 380 cross cut saw, which are fitted with fast servo axes, then move into position so that the central cut produces two panels of identical width and the chippers completely remove the varying veneer overhang on both sides of each panel. Here, chipping tools designed especially for trimming longitudinally to the grain of the veneer are used. These tools consist of multiple toothed trimmers that chop the veneer strips with high precision. These super trimmers also prevent the strip being 'diverted' on the rotating tool, running into the suction device and blocking it up. To separate the veneer strips from the core layer cleanly, the tool set is also equipped with a saw blade. The stepped arrangement of the toothed trimmers ensures a clean, tear-free exit at the rear edge of the panel.

This solution, with a saw line consisting of a double-end tenoner and cross cut saw with camera alignment, ensures that only a minimal amount of material is trimmed from the core layer. With an output of nine panels per minute, productivity is significantly increased and the objective of saving material is achieved.

Picture courtesy of: HOMAG Holzbearbeitungssysteme GmbH



**Figure 1:** FSQ 380 hogging tool



**Figure 2:** Untrimmed, unprocessed panels



**Figure 3:** Trimmed and separated panels



**Figure 4:** Alignment guide of the longitudinal machine



Figure 5: Hogger extraction hood

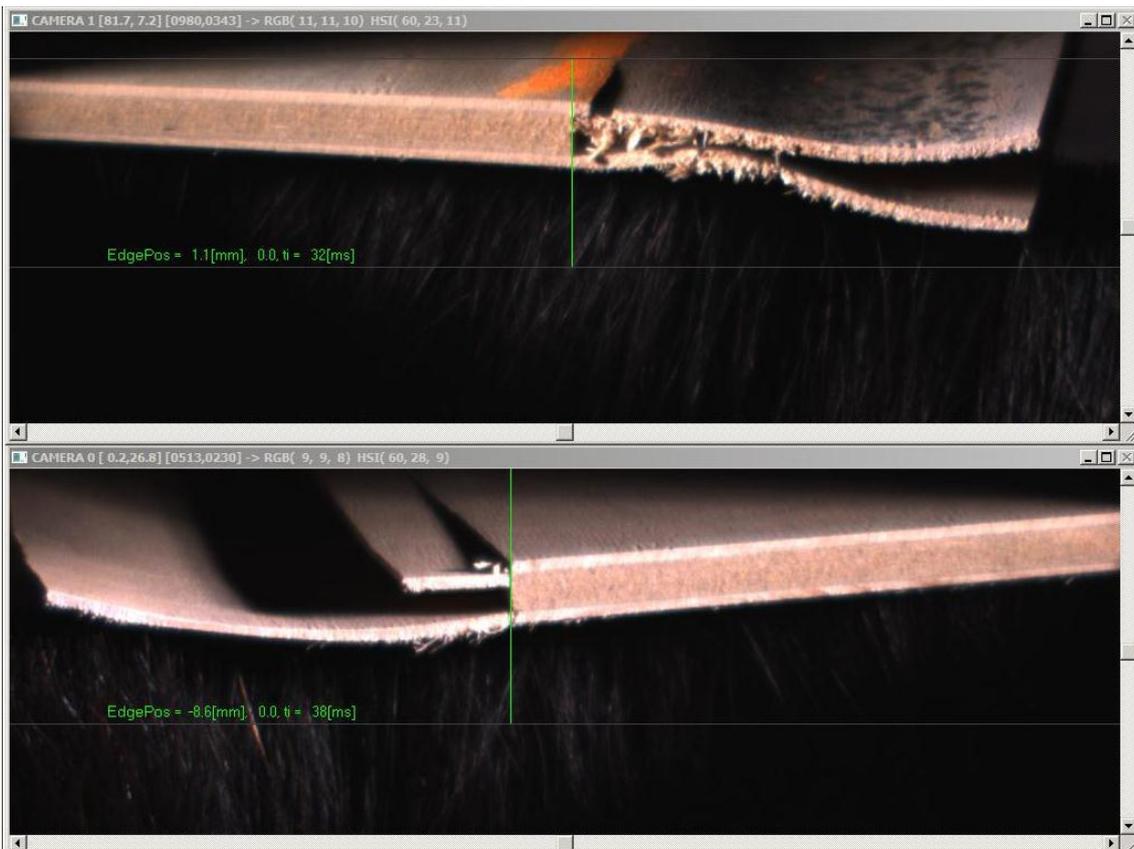


Figure 6: Images from the camera system with detection of the vertical rear edge of the HDF panel

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