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## Transformation of Roermond PM 1 using a shoe-blade gap former without suction rolls

S. Vrieze · Smurfit Kappa Roermond Papier B.V. · Roermond / The Netherlands  
V. Schmidt-Rohr · J.M. Voith SE & Co. KG I VPH · Heidenheim / Germany

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In 2012 Smurfit Kappa decided to focus on light weight packaging grades at Roermond PM 1 which had been built in the 1970s. As a first step of the transformation project "Aethon", the winder was replaced in 2014. The second phase in 2016 covered the complete replacement of the press section, sizer and dryer section by the latest technologies. In 2019 the project was finished with the installation of a shoe blade gap former and a new approach flow system.

After internal assessment of different forming concepts and based on practical experiences in its mills, Smurfit Kappa decided to go with these technologies. The most important criteria were good quality performance, low specific energy consumption, low total costs of ownership and a compact design. As supplier for the new forming section Voith was chosen due to the perfect cooperation during the large rebuild of press and dryer section in 2016 and due to the convincing results from the pilot paper machine.

The new approach flow system was designed by Smurfit Kappa based on in-house know how. Its key features are the minimized water volume, a 4-stage slot screening and a 5-stage cleaner plant.

The execution of the different project phases was finished without accidents and in the given time frame. Thus, after five years the old PM 1 was replaced by a completely new paper machine equipped with the latest technologies.

The DuoFormer CBh at Roermond PM 1 is a horizontal shoe-blade gap former which was developed for the manufacturing of packaging grades at speeds up to 1600 m/min. The DuoFormer CBh for the rebuild at Roermond PM 1 is equipped with a C-frame which does not require significant modifications of the existing structure of the building.

The optimised geometry of the impingement shoe as first drainage element was developed on the Voith pilot machine with a focus on highest paper strength. The second target was to optimise the design for maximum initial drainage capacity without creating sheet sealing. The results from the pilot machine are presented showing the impact of geometries and operation parameters on paper quality.

The design of the twin wire zone allows high production rates at low shear force intensity for high paper strength. Dry fabric separation grants forming section cleanliness. The DuoFormer CBh can be equipped with loadable blades. The influence of these blades on paper quality is discussed.

The web dryness increase after fabric separation is created by suction boxes as the suction couch roll is substituted by a grooved turning roll which is followed by a high vacuum suction box (HiVac). With this configuration very high dryness values are achieved before the pick-up point. This allows high web compression in the press section resulting in high paper strength levels.

The forming section without suction rolls distinguishes itself by low investment and operating costs because the expensive suction couch roll was eliminated. The operating costs for drive power of the fabric drives and vacuum plant are discussed as well as fabric costs and maintenance expenses.

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