

# WOOD PLASTIC COMPOSITE: TECHNOLOGIES

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Current trends in the field of ecology encourage manufacturers to create materials that are environmentally acceptable, but also customer have requirements on the properties of the applied materials and their durability. In the fact of this reason, in some branches of industry (flour / automotive / construction) are created “Green materials”, created by combining a plastic matrix (mostly PP, PE, PVC) and natural fibers. One of these materials are the Wood Plastic Composites (WPC) materials – wood-filled plastics (as an alternative solution). The WPC components (matrix + reinforcement + additives) are mixed under the influence of high temperature into a mixture followed by a forming step. Forming technologies suitable for WPC products include extrusion, injection molding and calendring. The presented paper is focused on the possibilities of WPC profile forming technologies.



Figure 1. Left side – WPC profile – floor, right side – SEM of sawdust (Atuanya and Ibhadode, 2011)

## MANUFACTURING TECHNOLOGIES

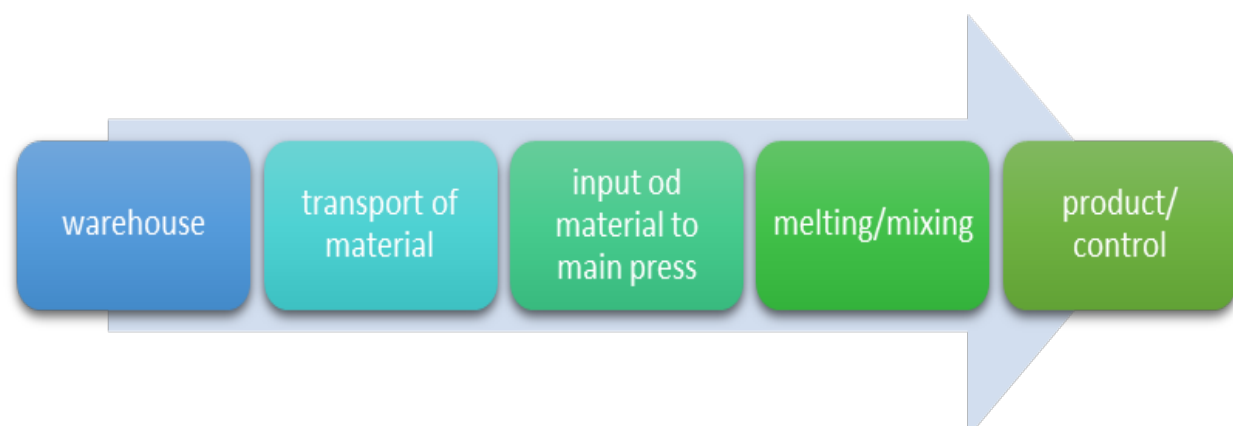


Figure 2. Stages of manufacturing process

Frequent manufacturing technologies of WPC materials include **extrusion** – for linear profiles, **injection molding** – for 3D components of regular and irregular shapes; for the production of flooring, it is possible to apply the little-mentioned method of **calendaring** – rolling.

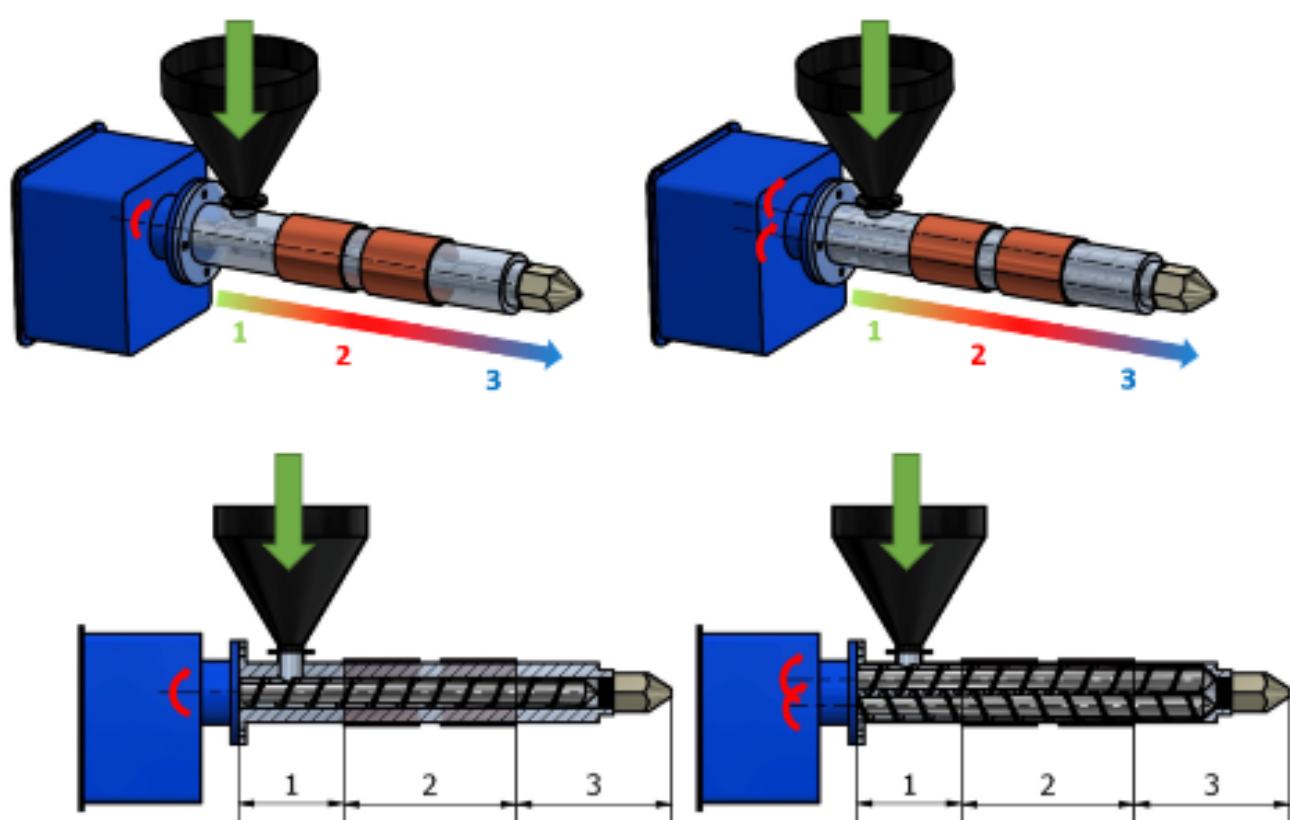


Figure 3. Extruders – single screw extruders, double screw-extruders

## CONCLUSION

There is a need to increase the lifetime of conventional renewable materials. In the production of processing wood-filled plastics itself, it uses the obtained wood flour as a secondary product in the furniture production. To a limited extent, it is possible to use recycled plastics (as a substitute for virgin plastic). The waste is not generated during the production of profiles – extrusion or injection molding technology. In this process, there is no need to use formaldehyde or volatile, harmful substances. In addition to the input parameters of the process, the main aspect of the production technology is also a dispersion of components – it can be obtained by additives or a suitable design of press machine.

## Acknowledgement

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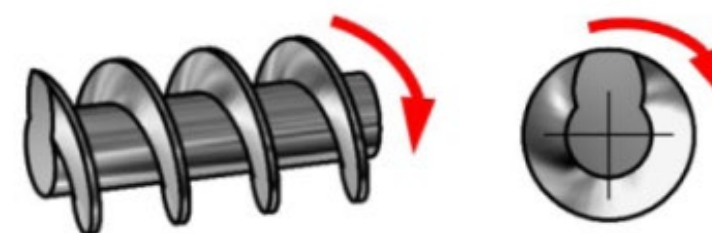
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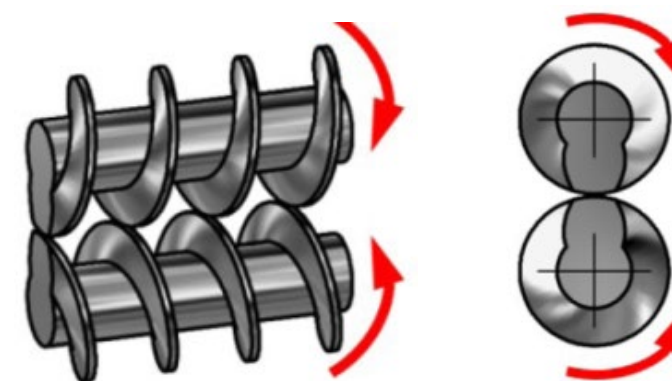
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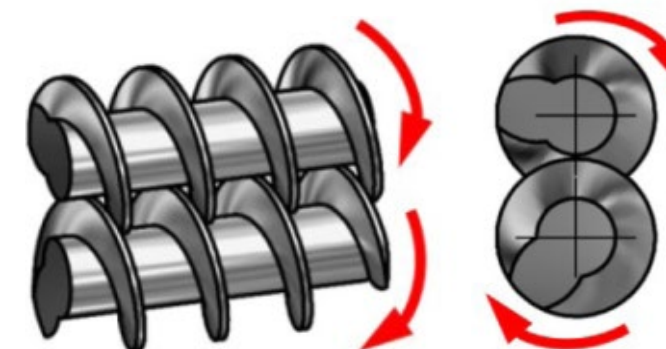
**One-roll press machine** – designed in 1935, **advantage** – low investment cost / **disadvantage** – necessary mixture drying system, premixing of the mixture (production of pellets)



**Two-roll press machine** – the first type – especially for WPC products with PVC matrices, **advantage** – low speed / **disadvantage** – necessary mixture drying system, premixing of the mixture, higher purchase price (compared to a one roll press machine)



**Two-roll press machine** – the second type – designed in 1953 by CoperionWerner & Pfleiderer, **advantage** – variable drive / **disadvantage** – higher purchase price (comparison to first type of machine)



**WOODTRUDER** – one roll press machine + control + press tool + tank with cooland + saw + table for fluid drainage, **advantage** – It is not necessary to pre-prepare the material by drying (moisture is removed by a vacuum deaeration mechanism) and premixing/ **disadvantage** – purchase price

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