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WOOD COMPOSITE RECYCLING: CREATING A VALUE-ADDED MANUFACTURING PROCESS

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Determining the best way to recycle wood-based panels remains a challenge for scientists world-wide. The global wood-based panel market was valued at around USD 16 billion in 2015, and projected to grow at 13% from 2016 to 2024. According to the Food and Agriculture Organization of the United Nations, wood-based panel volume (veneer and plywood, particleboard (PB), oriented strand board (OSB) and fibreboard) is about 416 million m^3/year. It is assumed that an equal volume of wood-based panels is placed out of service annually. This creates a mountain of wood-based panels in need of recycling or reprocessing, which does not account for process waste generated during these panels production. Researchers in Mississippi State University's Forest and Wildlife Research Centre have developed several unique processes to handle wood-based panel recycling. By using an optimized refining setup and panel structural design, scientists have determined a method to use more than 50% of recycled wood-based panels with less resin consumption by using recycled urea formaldehyde (UF) resin for panel manufacture. The scientists are using recycled polyurethane to partially substitute the UF resin in panel board production. Additionally, the scientists are using recycled plastic as wax in the panel board construction and developed way to recycle oriented strand boards. This breakthrough allows scientists to convert old OSB panels into new OSB panel materials for structural application. In this paper, we will review UF resin chemistry and different recycling technologies worldwide to reveal pitfalls in wood-based panel recycling world-wide. Future research should focus on how to use recycled, downgraded or waste material of one process as the raw material for other wood-based panel products. By using these "non-valuable" materials, the process adds value and enhances sustainability in wood panel manufacturing.

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