

EPDM Recycling Project Showing Early Signs of Success

The construction industry currently faces an opportunity to turn a problem into a solution. The problem is the growing amount of construction waste being removed from roofs. The solution comes from recycling projects currently in development, including one being conducted by the EPDM Roofing Association (ERA).

According to *Engineering News-Record*, 136 million tons of construction debris are created annually. In addition, the cost of virgin materials continues to increase.

The burgeoning green building movement, along with code changes enacted by regulatory commissions and legislative bodies, are pressuring the construction industry to plan for the reuse, recycling and reconstitution of excess materials from construction sites.

For example, Massachusetts implemented a statewide ban on landfill deposits for most construction and demolition waste materials, including asphalt pavement, brick, concrete, metal and wood, in July, 2006. Chicago enacted code mandates in January of that year that required recycling 25 percent of construction waste and increased that figure to 50 percent in January, 2007. In the future, all construction waste in Chicago most likely will have to be recycled, as currently is required in Toronto by an initiative prohibiting construction waste in landfills.

Additionally, the roofing industry increasingly

recognizes its obligation to reduce the effects of its materials and processes on the environment. Finally, it must be recognized that there also may be potential economic gain for owners, contractors, manufacturers and suppliers because EPDM can provide longevity and resist the effects of ultra-violet light.

In response to this, during 2006, ERA launched an EPDM recycling initiative to determine the possibilities of recycling used, in-place EPDM roof membranes and identify a potential market for using the byproduct. So far, the results of this project have been very positive and indicate that it is logistically viable to remove EPDM from a roof and create a product from recycled membrane.

The ERA task force formed to oversee the project established three goals to address the EPDM recycling initiative:

1. To provide a recycling option for EPDM membranes currently reaching the end of their service lives, as well as for excess EPDM materials from new construction job sites
2. To provide roof system designers motivation for specifying EPDM and procuring LEED points
3. To determine potential for reuse: What is the market demand for a product? What would be the potential continuous stream of materials coming into the recycling process? What is a final determination for end-use products?

One of the first steps in the process would be determining a method for removing,

transporting and grinding EPDM membranes. This would include removing, packaging and delivering the materials. Another key factor would be anticipating potential impediments to the success of recycling aged, post-in situ EPDM roof membranes, such as dirt, foreign contaminants, quality of the grind, cost of recycling, continuity of the material source and need of the end product by users.

Midwest Elastomers Inc. (MEI), of Wapakoneta, Ohio, came on board to take part in the pilot phase of the project, in September, 2005. Cookson Elementary School in Troy, Ohio, was selected for the first pilot project; it had a 40,000-square-foot ballasted EPDM roof system that had been installed in 1988. Command Roofing Co., Dayton, Ohio, agreed to participate, and roof system removal and replacement began during late May 2006.

In the pilot phase of the project, only ballasted roofs were used and sections of the roof with flashings and lap seams were cut out and not included in the recycling process.

The roof on Cookson Elementary was successfully removed, which required the removal of the ballast on top of the membrane, cutting out of seams and flashings, storing and binding the material on pallets and securing all material on-site until it could be moved to the grinder. During the project, task force representatives visited the site, observing the process.

The ballast on the EPDM roof was shoveled into linear rows of piled material and removed by shovel to waiting trash bins, which were taken to clean landfill sites where debris does not have to be treated and/or covered.

It is important for crews involved in removing the EPDM membrane to carefully remove debris from the top of the membrane, including stones, vegetation and tree debris. As a follow up, the area was broomed to dry the material, removing moisture from overnight dew or rain and remove minor contaminants that remained on the membrane.

Next, after removing the adhered flashings from the perimeter locations and cutting out the lap seams from the field sheets, the EPDM membrane then was folded and carried to waiting pallets on the rooftop. The process went swiftly, with about 200 squares removed within 15 minutes. Command Roofing removed the remaining insulation layers to expose the roof deck before installing a vapor retarder.

This process continued for about six weeks with the used EPDM membrane being stacked on pallets for delivery to MEI. Following removal of the EPDM membrane, ERA arranged transportation of the materials to MEI's headquarters, which was located about 20 miles away.

In August, 2006, the initial grinding of the pilot project's EPDM material took place. In what was considered standard procedure by the staff at MEI,

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employees removed some contaminants, including screws, plates, sealants and insulation pieces, by hand, as the grinding process began. The sliced sections of EPDM membrane then passed under a metal detector for additional contamination inspection, before moving onto a sloped conveyor belt, which transferred the material to the granulator.

While observing the process, the task force learned from the work crews sorting the materials that the amount of debris found in the membrane was typical for any type of recycled material. After two grinds, a 20-mesh product resulted, which contained only a minimal amount of dirt, leaving a product suitable for recycling. The 20-mesh product was given to Carlisle SynTec and Firestone Building Products, as well as additional representatives, so it could be examined, evaluated and tested for potential use in their products.

Additional projects were then instituted to deal with remaining concerns, such as on-site packaging and storage of the material, debris inclusion and surface foreign contaminate buildup. ERA also sought additional options for breaking down the membrane, to resynthesize it instead of grinding.

By the end of 2007, nearly one million feet of EPDM were located, removed, transported, ground and reused. The material was removed from roofs with loose-laid membrane covered by ballast or mechanically fastened systems. Both Firestone Building Products and Carlisle SynTec have

been able to use recycled material to make walkway pads for new or existing roofs.

The next phase of the project will focus on expanding the geographic range from which material will be gathered, adding other grinders, determining the amount of material that will be available on an ongoing basis and creating a likely cost structure.

If these remaining questions are answered satisfactorily, EPDM could serve as an ongoing, large-scale pipeline of recyclable material. EPDM roofing materials account for more than 1 billion square feet of new roof coverings in the U.S. each year, with more than 500,000 warranted roof installations on more than 20 billion square feet of EPDM currently in place. The qualities that make EPDM membrane popular in the roofing industry—flexibility and resistance to various climatic conditions, including ultraviolet radiation—should make it an attractive recycled material option.

In order to more swiftly offer this recycling benefit throughout the country, ERA requests that companies that are grinders or those that would have a use for rubber that has been ground to contact ERA offices, at (301) 654-5090 or info@epdmroofs.org.

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