

Table 1: Summary of Recycled Glass Uses

(Source: Lisa A. Skumatz, Ph.D. and Juri Freeman (Skumatz Economic Research Associates, Inc. Superior, CO), "What do we do with these piles? Finding alternative uses for glass piles requires a closer look at lower value but cost-effective applications", *Resource Recycling*, June 2007)

Strategy	Program	Results
Aggregate and Road Uses		
Road aggregate for base material	Some states have set specifications for road aggregates that provides for up to 10% of reclaimed glass be blended with other aggregates as a Class 5,6 or 7 road base material	It is common, well proven, and safe. Research has shown that recycled glass can actually improve the quality of gravel in an aggregate mix for road base, and can be used up to 100% as a base in some cases. Aggregate contractors use the same machines to crush glass as they use to produce aggregate. Can enhance permeability of road surface, and decrease stream runoff. Costs savings depends on aggregate prices.
Road cover for landfill	Use the pulverized glass at the landfill in two capacities: 1. Larger pieces can be used as a road base 2. Smaller "sand" size glass can be used as a dust control device.	Both uses are successful. As a dust control, it works better than water because it reflects the sun and keeps the ground from drying out as quickly. As a road base, the permeability of the glass is an advantage.
Road material: Glassphalt	Use 5-10% reclaimed glass mix with asphalt and aggregate for road surface.	Has been used for over 30 years on country roads, highways and even airport runways. Lifetime, wear, slippage, and cracking have been proven to be comparable to conventional surface materials. Reports of glass "popping" out of surface in heat, same as rocks, but more citizen complaints around glass. Satisfactory with public in some communities, though not in all.
Airport runway	10% reclaimed glass aggregate used for airport runway and apron surface.	Installed a 3000x40' runway about eight years ago that has worked well. Used approximately 400 tons of glass in the construction of the runway. Passes inspection of state, and over time, skid resistance has actually increased.
Salt/sand mix for roads in winter	Mix with sand, salt or magnesium chloride to apply to the roads and sidewalks in the winter.	Very successful as a non-slip application, it increases traction significantly for both roads and sidewalks.
Locomotive traction sand	Railroads use the recycled glass to put directly onto the rail lines from the locomotive.	Has worked well to date, but not used in many areas. The application of the traction sand is controlled automatically from an on-board computer based on analysis of slippage and traction. Crushed and cleaned, recycled meets standards. Potential for replacing silica where silica dust raises health concerns, or where existing silica is not clean or contains high levels of clay. ¹
Striping	Use glass as reflective material in road stripes or cross walks	Very successful, but not using much tonnage. Some DOTs have discovered that paint adheres better to glass than other aggregates. Glass also lasts longer, and retains sparkle longer than other materials.
Filtration, sand, and abrasives uses		
Pipe bedding or septic system mounds	Lay below pipes when installing or build septic mounds.	Works well and studies have found it to be technically sound. Good potential for recycled because color mix, labels, and residual sugars are not an issue. Good drainage qualities.
Filter sand for pool and septic systems	Use rejected glass from windows for septic filtration, pool, and industrial applications	Works better than silica and has many advantages. It is lighter and less volume is needed. For pools it has higher clarity than silica, reduces backwash by 21%, and saves energy. For septic it does not clog as much as silica and lasts longer.

¹ Clay content increases slippage.

Strategy	Program	Results
Sand for beaches, golf courses, or playgrounds	Pulverize sand to a small enough grain to be used on a golf course or playground	Preliminary testing on beaches and golf courses has shown the potential of this use. Public perception and cost are issues. (see "Beached glass" in the February 2007 issue of <i>Resource Recycling</i>)
Industrial abrasives	Use recycled glass as an abrasive for cleaning, scouring, and blasting of various surface types.	A very successful use for recycled glass. Glass as an abrasive has proven advantages. ²
Landscaping, Tiles, and other uses		
Landscaping	Give away glass as a landscaping material for free at landfill.	Some communities reported liking the way it looks, while others did not. Some (fermented alcohol) odor issues if not washed.
Trail bed	Cover trails in glass sand.	Generally, hikers have not liked the look of the trails. Also, the glass must be repeatedly screened to remove all labels and contamination. Has worked well in national park that had trail drainage issues.
Compost	Mixed crushed glass with compost.	Mixed success. Reports that glass would make its way to the bottom of the pile and it was also "sparkly". Can improve the drainable quality in areas with poor soils; some areas already have "sparkly" soil.
Glass-epoxy flooring	Sell pulverized glass to flooring company for seamless flooring or counter tops.	Can be potentially very successful. Limiting factors include: 1) the distance to a manufacturing plant 2) consistent quality and color of collected materials. Life cycle in use as floor covering is strong.
Kiln process	Integrates recycled glass into conventional ceramic processes to make tiles and countertops	Quite expensive process for not a lot of glass tonnage but very nice high end artisan product. Some technologies being patented. ³

About the Authors: Dr. Lisa A. Skumatz, an economist, is Principal of the research and consulting firm Skumatz Economic Research Associates, Inc. (SERA); Mr. Freeman is a project manager at SERA. SERA (www.serainc.com) specializes in economic and policy analysis of solid-waste management, especially program evaluation and cost-effectiveness, rate studies, incentives, integrated planning, and modeling/forecasting. SERA has worked with community, state, and federal solid waste clients across the US, Canada, and overseas, and has more than six dozen publications on solid-waste and resource economics. SERA maintains offices in Boulder, Colorado and Washington State. Contact information: 303/494-1178, Skumatz@serainc.com.

² Additional information from interviews and research on this use follows. Interviews / research indicated glass is angular and can cut sub-coatings well. The "white metal" finish is reported to be superior to other abrasives. There may be potential for lower dust generation. The material may be reused, is less dense, and produces more volume per ton. Also recycled glass has none of the heavy metals of smelter-derived abrasives. Most currently use rejected and recycled window glass rather than curbside because screening and cleaning needed to avoid clogging sprayer lines. Economics need improvement in areas where alternatives are inexpensive / readily available.

³ This application shows considerable promise, and tonnage use may have greater potential than initially indicated.