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CONTACT
Larry Zanko, UMD’s Natural Resources Research Institute
5013 Miller Trunk Highway, Duluth, MN 55811
Phone 218-720-4274  Email lzanko@nrri.umn.edu

Donald Fosnacht, Ph.D., UMD’s Natural Resources Research Institute
5013 Miller Trunk Highway, Duluth, MN 55811
Phone 218-720-4282  Email dfosnach@nrri.umn.edu

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Properties and benefits of taconite by-products—an introductory guide for local and state practitioners.
Mesabi Hard Rock aggregate and where it comes from

Taconite is low-grade iron ore mined from the Mesabi Iron Range in Northern Minnesota. It is a very hard rock.

Mesabi Hard Rock is a form of aggregate derived from the by-products of taconite mining. Mesabi Hard Rock materials range in size from fine to coarse aggregate (and larger), and can be used for a variety of purposes.

Benefits of Mesabi Hard Rock

The construction industry, existing aggregate suppliers, and state and federal transportation agencies are actively looking for alternative sources of harder and more durable aggregate. Hard rock by-products that are incidentally generated during the mining and production of taconite ore can immediately provide such an alternative.

GOOD AGGREGATE IS BECOMING A SCARCE COMMODITY
In Minnesota’s seven-county metro area, demand for aggregate has been projected to exceed supply in the next 10 to 20 years. Similar resource availability issues are facing metropolitan areas nationwide.

READILY AVAILABLE
Minnesota’s Iron Range produces tens of millions of tons of Mesabi Hard Rock every year.

MESABI HARD ROCK IS A “GREEN” OPTION
Maximizing resource utilization with minimal environmental or aesthetic disruption is an important societal goal. Mesabi Hard Rock could be a significant alternative or supplemental source of aggregate for many locales, helping them meet that goal.

How can we get Mesabi Hard Rock?

What transportation options are available for getting Mesabi Hard Rock materials to market?

Class 1 rail systems already service the mines, and have direct access to Great Lakes and Mississippi River loading facilities.

Transportation costs may be reduced by arranging for “back-haul” opportunities by rail, boat, or barge.
Mesabi Hard Rock success stories

Mesabi Hard Rock has been successfully used in road construction in Minnesota since the late 1960s. Over the past six years (2001—2006), Mn/DOT used approximately 2.3 million tons of taconite by-products in road construction projects.

Some examples of Mesabi Hard Rock uses in Minnesota include:

- 15 percent blend in the SuperPave™ mix, as Fine Filter Aggregate and as granular borrow on Highway 169 from Virginia to Chisholm;
- granular backfill in the subgrade on the Highway 53 beltline around Virginia;
- 100 percent of the aggregates in the wear course on Highway 135 from Highway 53 to Aurora; and,
- 100 percent of aggregates in the wear course at the Brainerd Speedway.

Properties of Mesabi Hard Rock

Mesabi Hard Rock is extremely hard and has high strength (meeting or exceeding Department of Transportation hardness specifications).

Asphalt mixes using coarse Mesabi Hard Rock have higher friction values that make this product an attractive addition to bituminous mixtures. It provides higher skid resistance in road and bridge deck applications.

Gradations of some taconite by-products are similar to FA-1 fine aggregates for bituminous and concrete mixes and for sealcoats.

MAJOR MATERIALS AVAILABLE

- Fine Aggregate: 3/8” minus (coarse and fine)
- Construction/pavement Aggregate: <2.5” (cobber rejects and ballast)
- Coarse products: >2.5” (shot rock)
Wherever aggregates are needed, Mesabi Hard Rock can be substituted. It is especially suitable when high-angularity aggregate is desirable because it is a 100% crushed product.

PRODUCTS IN USE
- Granular fill
- Base aggregate
- Bituminous overlay aggregate
- Aggregate for Stone Matrix Asphalt (SMA)
- Skid-resistant surfaces for bridge decks, etc.
- Railroad ballast
- Dike, levee, waterway, and shoreline materials (riprap and armor stone)
- Geotechnical building foundations

POTENTIAL PRODUCTS BEING TESTED
- Pothole patching compounds
- Concrete aggregate