

Chapter 2

Commercial Uses of Duneland Sand and Gravel

Sand is an important natural resource. Commercially, it has many uses.

- **Fill:** Sand is desirable as a fill material because it settles quickly and can remain stationary as long as it is kept from the eroding actions of water, wind, and human intervention. Northwest Indiana sand has been shipped to Chicago and dumped into Lake Michigan to “create” new land east of the city and it has been used to elevate the land for Northwest Indiana and Chicago-area roads, highways¹, and railroad lines. It is also used for backfill around commercial and residential buildings. Sand’s great permeability is an asset in many cases because it allows water to flow through it.



Using dune sand to raise the ground surface for construction of the tracks of the South Shore Railroad, circa 1906. Note that the source of energy is a horse. [Courtesy of Ed Hedstrom]

“Practically all the railroads entering Chicago have used this sand in track ballast and elevation. Great trestles have been filled and swamps and marshes along rights of way have been covered with the sand.”

Shannon, *Proceedings of the Indiana Academy of Science*, 1911

- **Mortar and concrete:** Mortars may be made from sands that are either fine or coarse grained, rounded or sharp/angular, monochromatic or mixed hues. The color of the sand, however, affects the color of the mortar and is thus very important to the mason and architect.
- **Paving:** Sand can be mixed with petroleum products and used to fill potholes.
- **Bottle glass:** Glass is made of quartz that has been melted and then allowed to cool quickly so that quartz crystals do not reform. Thus in glass, all the original texture of the sand (grain size and roughness) is lost. Glass sand must have a silica content of about 98%. Another essential property of glass sand is particle size. Because the sand must be fused without burning, the majority of glass sand grains should be able to pass through a sieve of 20 meshes per inch but not through a sieve of 120 meshes per inch.² Calcium carbonate is not a problem since limestone is added to the sand mix as a flux. Iron oxide whenever present gives the glass a green color. Clay impurities make the glass cloudy.

¹ Whereas in the early days any type of sand could be used as fill for roadbeds, the State of Indiana now has strict guidelines that include particle size, composition, and durability. [Carr and Webb, 1970]

² Logan, et al., 1922, p. 1047.

- Silica brick (made from sand) is used for lining furnaces, kilns, and other chambers for high temperature processing.³
- Sand Lime Brick: This type of brick is made from a mixture of sand and lime (calcium oxide, CaO). The mixture is pressed into bricks and then subjected to 12-15 hours of high-pressure steam. The resultant brick becomes firmer and harder than clay-based bricks. The first Indiana plants to make this type of brick were located in Michigan City.⁴
- Abrasives: sand paper, sanding disks, and sand blasting. Many commercial cleansers and scouring powders are made of pulverized quartz sand. Sand is the most widely used of all abrasives.⁵



The Sand Brick and Building Block Factory and rail tracks at the southeast corner of the Hoosier Slide in Michigan City. [Shannon, 1912, p. 205]

In addition, sand is used commercially as an enabler—to make things that may not be made of sand, but require sand in their creation. This includes thousands of metal items used in the home and in industry such as kettles and skillets, candlesticks, bells, stoves, and locomotive wheels. The common process in the creation of these items is their being formed in a foundry from molten metal.⁶ Quartz sand is useful for molding because the mineral quartz is refractory—that is it withstands high temperatures without deformation and without becoming part of the product. Most often, foundries discard the core after it is used once because the burned surfaces compact the sand. It was found to be more economical to use fresh dune sand for each use. Discarded cores, however, still make satisfactory fill material. Enabling uses of sand include:

- Molding and core sand: These sands are pressed into a variety of specific shapes (molds) and molten metal is poured inside. The qualities of sand used in this process are very specific. Molding sands of finer and finer textures have become required. Core sand is used to fill the spaces where metal is not needed or wanted. Indiana Dunes sand was particularly suited for cores in large castings and for the most exacting ferro-allow casting.⁷

“Sand dunes near Michigan City supply most of the sand used by Indiana foundries for core-making.”

*Yearbook for the State of Indiana. 1918.*⁸

- Grinding and polishing, including sand paper.
- Engine sand is used to increase the friction between locomotives and the rails beneath them.⁹ It is poured on the rails as necessary. A fairly sharp quartz sand containing no clay particles

³ Patton, 1976, p. 58

⁴ Blatchley, 1907, p. 68.

⁵ Patton, 1976, p. 58.

⁶ Patton, 1976, p. 57.

⁷ Bieber and Smith, 1952, p. 24-25.

⁸ Goodrich, 1919, p. 204

and which is fine grained and dry enough to be poured is useful for railroads. Indiana sand for this purpose has been valued by Chicago-area railroads because the quantity of sand was so high and the location so close.¹⁰

- Fire and furnace sand: Because sand is refractory, it has been used by Calumet-area steel mills in the troughs through which melted iron from blast furnaces flows to ladles or ingot molds. This use requires sand with a high silica content (and thus low content of calcium, phosphorous and sulfur). The sands located in the Calumet Beach deposits near Crisman have been especially suited for this use.



Crisman sand¹¹ lining the troughs through which molten iron flows from an Inland Steel blast furnace.

[Inland Steel Collection, Calumet Regional Archives]

- Other and minor uses: Dune sand was also used for filtering, sand beds for laying brick,¹² play (in sand boxes), traps (on golf courses—including one for a private golf course near Kentland, Indiana, owned by the Hoosier humorist, George Ade), sand bathing beaches for inland Indiana lakes, and flood control (via sand bags).

Probably the most surprising use of Duneland sand was for a cemetery. Pittsburgh Plate Glass Company at Kokomo, Indiana, used Michigan City sand for grinding and polishing. The used sand, with a worn-down flour-like consistency was discarded nearby. According to Carter Manny, who ran the Hoosier Slide Sand Company, the dump became a “gigantic hill.” The company eventually sold the land with the sand hill to the city of Kokomo to be used as a cemetery.¹³

Production of Sand in Indiana: 1922¹⁴	
Glass sand	40,000 tons
Molding sand	300,000 tons
Building sand	2,000,000 tons
Abrasive sand	50,000 tons
Engine sand	60,000 tons
Paving sand	260,000 tons
Railroad ballast sand	100,000 tons
Other sands	<u>140,000 tons</u>

⁹ Carr, 1971, p. 12

¹⁰ Bieber and Smith, 1952, p. 26.

¹¹ John Magurean, President of Crisman Sand Company, confirmed in December, 2014, that the company did sell sand to Inland Steel Company.

¹² Bieber and Smith, 1952, p. 24-27

¹³ Manny, 1961, p. 8.

¹⁴ Logan, et al., 1922, p. 1050.

Total	2,950,000 tons
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Suitability of Indiana Dunes Sand for Commercial Purposes

Fortunately for those who wanted to mine and sell Indiana Dunes sand, this natural resource met many of the requirements for specialty sands. It had the high silica content or grain sizes that were needed by municipalities and industries.¹⁵

Beach and dune sands found in Lake, Porter, and LaPorte counties met the specifications for fill, bottle glass, core sand, engine sand, mortar, blasting sands, molding and furnace sand, and refractory brick.

Commercial Uses of Gravel

Gravel was one of the first natural resources mined in Indiana as it was used in large amounts for constructing all-weather roads. The industry grew rapidly soon after the organization of county governments,¹⁶ which had the responsibility of building and maintaining road systems.¹⁷ However, this was in the days before railroads had begun to crisscross northwest Indiana, and so most transportation was then by horse-drawn cart.

Many of the small abandoned gravel pits throughout Indiana were operated by the counties, which maintained their own pits and processing equipment in order to supply their needs.

The main uses of gravel have been as a coarse aggregate for concrete in order to build highways, runways, buildings, dams, and bridges.¹⁸ Much gravel is also used for highway subgrades.

There has been no large-scale gravel mining in the Indiana Dunes.

¹⁵ Carr, 1971, p. 13.

¹⁶ LaPorte County was created in 1832, Porter County in 1836, and Lake County in 1837.

¹⁷ Carr and Webb, 1970, p. 15.

¹⁸ McGregor, 1963, p. 12.