



 **IONICS INC.**

Z E R O W A S T E
Rock Kleen
A REVOLUTIONARY TECHNOLOGY

Tailings Recovery

+ 100% Neutralization of Residual
Cyanide/Sulfuric Acid

Rock Kleen and the Global Scarcity of Construction Sand

While there's an abundance of sand on Earth, sand suitable for construction – with the right grain size and composition – is becoming increasingly scarce due to factors like rising demand and unregulated extraction. This scarcity isn't because we're running out of sand entirely, but extractable sand on beaches and in rivers is being protected by governments to prevent environmental damage.

Sand scarcity can be addressed through the recovery of sand from mine tailings. Construction and concrete sands are angular, the type of angularity that is a result of the blasting process. Quality rock sand can be cleaned of metals and processing chemicals using the Rock Kleen Tailings Recovery Process. Rock Kleen neutralizes cyanide and acids and breaks down blasting nitrates while recovering residual metals.

Environmental Damage

Obtaining sand often involves extraction from rivers and beaches. This can disrupt ecosystems, cause erosion, and harm marine life. Unsustainable sand mining practices can also lead to saltwater intrusion into freshwater aquifers and affect water supplies. There's some debate about how imminent a true sand crisis is, with some arguing the vast deserts hold plenty of sand, but desert sand is not angular, but round, making it unsuitable for construction use. Regardless, there's a growing need for more sustainable practices in sand use.

The Looming Threat

A Deep Dive into Construction Sand Scarcity

Sand, often taken for granted, is the second-most consumed resource on Earth after water. But unlike water, sand isn't infinitely available, especially the kind needed for construction. That is why the Rock Kleen Tailings Recovery Process brings a sustainable solution to the sand scarcity problem. This report explores the growing scarcity of construction-grade sand, its impact, and potential solutions.



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The Unsustainable Trajectory

The global demand for construction sand is staggering. Estimates suggest an annual consumption of around 50 billion tonnes – enough to build a wall around the Earth nine stories high! This is driven by rapid urbanization, especially in developing nations, and a growing infrastructure push. The United Nations Environment Program (UNEP) reports a concerning 6% annual increase in sand extraction, highlighting the unsustainable nature of current practices.

Beyond Scarcity

Copper and gold mining alone will produce over 6 billion tonnes of tailings each year. These tailings when Recovered using Rock Kleen would not solve the sand issue but would go a long way in addressing it.

The Economic Impact

While a true global depletion of sand seems unlikely, the bigger concern lies in accessibility and affordability. Here's how scarcity impacts us:

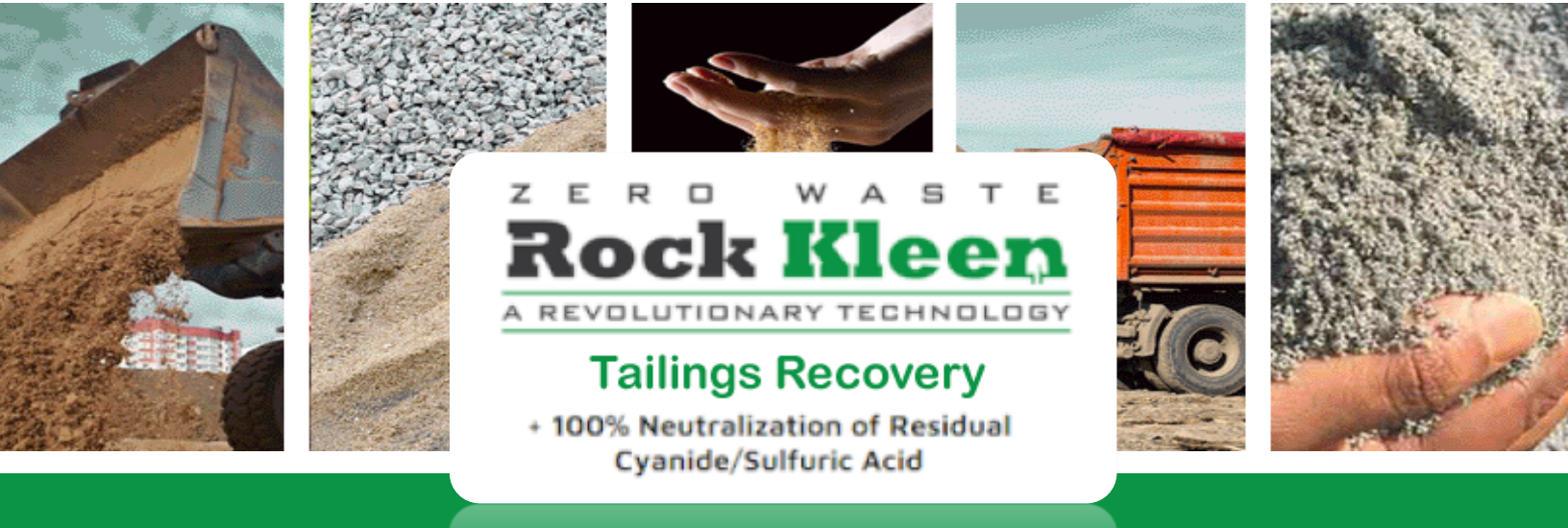
- **Rising construction costs:** The difficulty and environmental costs of obtaining suitable sand can significantly increase its price. This translates to more expensive construction projects, impacting everything from housing to infrastructure development.
- **Supply chain disruptions:** Sand shortages in specific regions can disrupt supply chains, causing delays and project cancellations.

A Call for Sustainable Solutions

The construction sand scarcity issue demands a multi-pronged approach:

- **Regulation and Monitoring:** Stricter regulations on sand extraction are crucial to ensure environmental protection and prevent illegal mining practices. Monitoring sand use and implementing quotas can also be vital.
- **Alternative Materials:** Research and development of alternative building materials that use less or no sand is essential. Recycled materials and innovative concrete mixes offer promising solutions.





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Sand Substitution and Recycling: Exploring possibilities for using alternative materials like crushed rock or even treated wastewater sludge in specific applications can reduce reliance on virgin sand. Additionally, exploring ways to recycle construction and demolition waste for sand extraction can be beneficial.

The Rock Kleen Tailings Recovery Process addresses both environmental issues and sustainability issues. Rock Kleen can generate “clean” angular sand suitable for construction use.

Conclusion

A Shift Towards Sustainability

The scarcity of construction sand is a complex issue with environmental and economic ramifications. Transitioning towards sustainable practices through regulations, technological advancements, and responsible resource management is critical. By acting now, we can ensure a future where this vital resource continues to support development without jeopardizing our planet.

The Rock Kleen Tailings Recovery Process takes a major step in addressing the sand scarcity problem. Rock Kleen addresses both the environmental issues but also promotes a sustainability model that uses all the mineral resources mined. Rock Kleen promotes green mining and helps protect the environment.



Further Resources:

UN Environment Programme: Sand and Sustainability: 10 Strategic Recommendations to Avert a Crisis <https://www.unep.org/resources/report/sand-and-sustainability-10-strategic-recommendations-avert-crisis>

Unearthing tension: Sand runs the world, but most don't realize the conflict it generates <https://theweek.com/news/science-health/960931/why-is-the-world-running-out-of-sand>

**Rock Kleen Benefits:**

- Targets 100% Beneficial Use
- Recovers Residual Metals
- Recovers Mineral Nutrients
- Recovers Industrial Minerals
- Recovers Nitrogen
- Neutralizes Cyanide
- Cleans the Environment
- Maximizes Sustainability

ROCK KLEEN = ZERO WASTE

Rock Kleen is a revolutionary, disruptive 'tailings recovery' technology. Rock Kleen recovers residual precious metals, base and ferrous metals, nutrient materials, and industrial minerals from what are considered spent mine tailings. Tailings are the crushed rock and clays left-over after separating silver, gold, copper, or other primary metals from the mined product. Tailings may contain residual contaminants, which can potentially damage the environment; silver/gold tailings are contaminated with residual cyanide, while copper tailings are contaminated with residual sulfuric acid. Some tailings are piled onto large pads, while some are stored and managed in over 18,000 tailings dams around the world. Either way you store them, tailings have long been a global problem, that is, until now.

Rock Kleen is a new addition to the Itronics Cleantech Materials Portfolio and was developed to turn tailings into recoverable resources, instead of long-term liabilities; that is, the ability to make a profit while simultaneously cleaning the environment. When Rock Kleen is implemented, the goal is to utilize the whole resource, so nothing is wasted; in many cases 100 percent beneficial use can be realized. Rock Kleen goes even further and neutralizes residual cyanide in gold or silver leaching, or sulfuric acid used in copper leaching, or blasting nitrates, thereby rendering tailings clean, just as nature intended.

Rock Kleen recovers residual gold, silver, and copper, lead, nitrogen, sulfur, iron, nickel, potassium and four U.S. critical minerals, copper, zinc, magnesium, and manganese. After recovery efforts are complete, the remaining clean rock can then be sized and sold as industrial minerals; in the end, nothing is left, all is recovered, profits are made, and the environment improves.

Rock Kleen recovers tailings (heap leach or mill tailings), it can plug into existing projects processing flow sheets, and it can be used to recover historic tailings, in a current operation or in a new mine design.



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