Incineration Ash recycling Solution ARC-Sand

by

Tsuneishi Kamtecs Corporation

ツネイシカムテックス株式会社

About Tsuneishi Kamtecs Corporation

Tsuneshi Kamtecs Co. is a 100% subsidiary of the Japanese shipbuilding giant Tsuneishi Group from Hiroshima. The group has more than 100 years of experiences in maritime industries such as shipbuilding, transport and logistics.

Tsuneishi Kamtecs Co. began with the recycling of ship waste oil. Based on our solid business skills, the company develops fast and today we recycle various types of industrial waste to produce energy and convert the waste into fuels, construction materials and other valuable recycled materials.

We think seriously and provide solutions to achieve a circular economy.

Tsuneshi Kamtecs Co.
Established in 1967
Head office and R&D center in Hiroshima
Officies in Tokyo, Nagoya; Osaka & Fukuoka
Transport base in Hiroshima, Okayama, Tokyo & Saitama
Recycling facilities in Hiroshima (10,200 m2 and 183,200 m2), Saitama (16,200 m2), Fukushima (5,000 m2)
Oversea offices in Thailand, Bangladesh, Vietnam, Malaysia

About our incineration ash recycling solution



Incinerator ash is generally treated as an end waste and buried in a landfill site for safety reasons. In Japan, the ash consists up to 70% of all landfill capacity.

Reduction of incineration ash volume prolongates the landfill life time.

Recent effort enables the ash to be recycled as road sub-base and cement mixture but only the fraction of bottom ash with greater than 2mm is subject to these recycling schemes as smaller fractions contain high level of contaminants such as heavy metals and chlorides. Even if the smaller fractions can be used as cement mixture after vigorous chemical washings, the quantity of solid waste incineration ash is far greater than the cement industry's need.

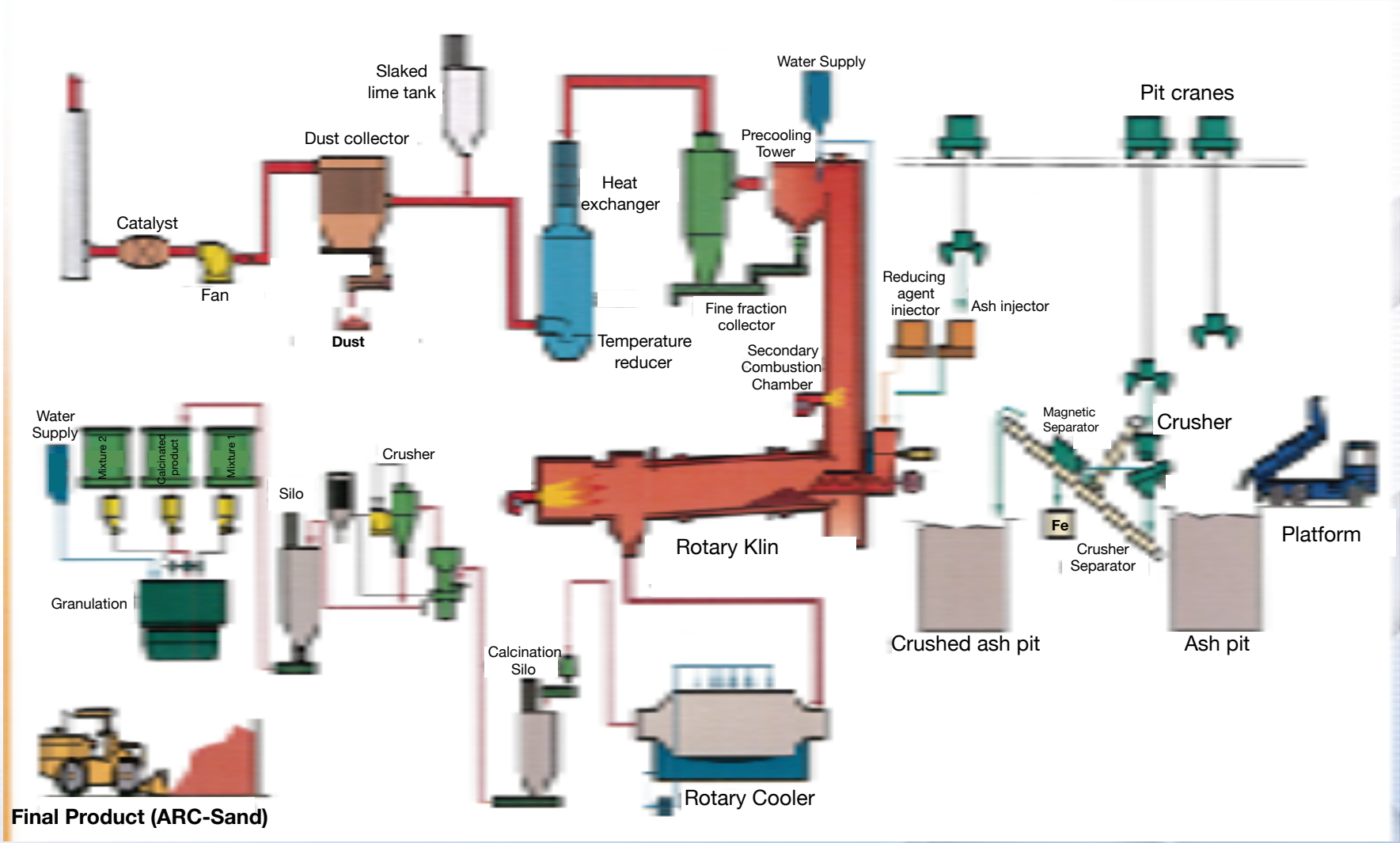
Tsuneishi Kamtecs Co. developed in 2003 a thermal treatment technology to transform the ash and fly ash into artificial sand (ARC-Sand), that is safe enough to be exposed to the environment (surface covering material, and not a bedding material).

ARC-Sand technology enables:

- ➤Reduction of incineration waste (the final waste quantity is about 2 - 10% of the total volume)
- ➤Production of a valuable end product with various applications

Recycling Process Schematic

Treatment Capacity: 150 ton of ash / day
Sand Production Capacity: 114 ton / day (end product: ARC-Sand)



About ARC-Sand production system

Stand-alone recycling solution: no need of cement industry

Once the ash waste is transformed into ARC-Sand, it is valuable as ARC-Sand has various advantages over natural sand (explained later). Thus, this recycling scheme does not require cement industry as end recipient as in other types of ash recycling schemes.

Various sources of waste can be used

- ➤ Ash and fly ash from municipal solid waste incinerators
- ➤ Cinders, dust, sludge, and slug from industrial processes

Waste-to-Energy solution: just like a cement plant

ARC-Sand is calcinated in a kiln just like in a cement factory. It is a LNG-fired gas klin, but it can use alternative fuels such as RDF (refuse-derived-fuels) as fuel supplement. So ARC-Sand production plant can become a recipient for various recycling schemes (RDF, plastic fuels, etc).

Non-toxic nature of ARC-Sand

ARC-Sand is calcinated at 1000°C under reducing conditions during 1 hour. The process allows thorough and homogeneous thermal treatment. The process allows heavy metals to form metal chlorides that are collected as dust, just like fly ash* in conventional incineration processes. Our regular sample analysis never failed for heavy metals and dioxins standards set by the Japanese Ministry of the Environment.

- ➤Chlorides have a lower boiling point (than oxides and phosphates) so they will volatilise in the incinerator and finish in the fine particle collector.
- ➤The safety of ARC-Sand was validated and certified by the Japanese Ministry of Land, Infrastructure, Transport and Tourism.

* The bottom ash from a conventional incinerator rarely contains metal chlorides which can only be found in a very fine fraction of the bottom ash.

Characteristics of ARC-Sand

Particularities of ARC-Sand

1: High water absorption (about 20%)

➤Water content of ARC-Sand is less than 0.4% (incinerated twice!), and it has a high porosity. So it has a great ability to encapsulate water inside.

2: Cools air in hot days and in hot regions

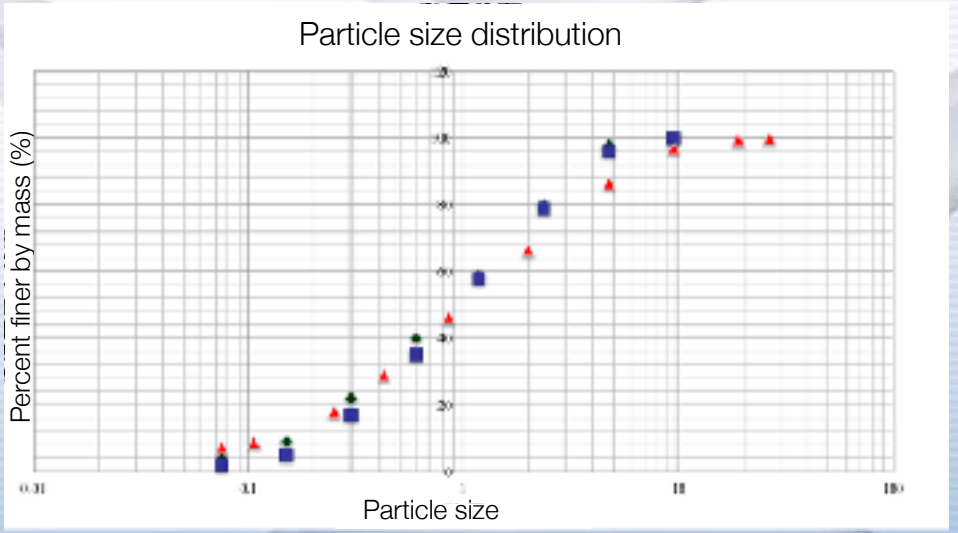
➤When the trapped water evaporates under the sun, the vapour cools its environment. ARC-Sand is highly appreciated as a natural cooling material when it is used for pavements.

3: ARC-Sand prevents grass growing

➤After two incineration processes, it is guaranteed to have no nutrients for grass growth

➤Grass can not sprout as ARC-Sand absorbs water so well

To prevent the grass growth, ARC-Sand layer is recommended to be **greater than 15 cm**.



Large particle distribution contributes to the good compaction characteristics of ARC-Sand

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Application of ARC-Sand

ARC-Sand can be used for:

1: Construction of pavement
2: Heat island preventive material
3: Grass growth preventive material

Ex: Under solar panels

Ex: on the plant farms

Ex: pavement in a park

Ex: road divider zone

Thank you for your interest and attention.

We would like to share our experience with foreign companies.
We are open for different kinds of discussion and collaboration.

We have 15 years of experience with ARC-Sand Recycling system, and our greatest challenge was to find various ways to use ARC-Sand.
Today, we produce about 250 tons of ARC-Sand per day, and all of our ARC-Sand is sold immediately.
We are planning to construct our second ARC-Sand plant with the same capacity to answer to high demand from ARC-Sand users.

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